Westmorland & Furness Council

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Cumbria Local Nature Recovery Strategy

Statement of Biodiversity Priorities

Supported by:

Cumberland Council

Lake District National Park

YORKSHIRE DALES National Park Authority

NATURAL ENGLAND

Foreword

Cumbria's unique natural environment is a vital part of our county's cultural identity. It provides habitats for some of England's most threatened species and delivers wider benefits that our communities and economy rely on. The environment underpins the wellbeing of local people and the prosperity of the county.

Cumbria's Local Nature Recovery Strategy (LNRS) is a call to action. It is an inspiration for anyone who wants to play their part in addressing the biodiversity and climate crises. The LNRS is a tool that prioritises nature recovery in places where it will have the greatest impact for people and nature. Everyone working to address biodiversity loss in Cumbria is contributing to a bigger picture of nature recovery and everyone can play their part.

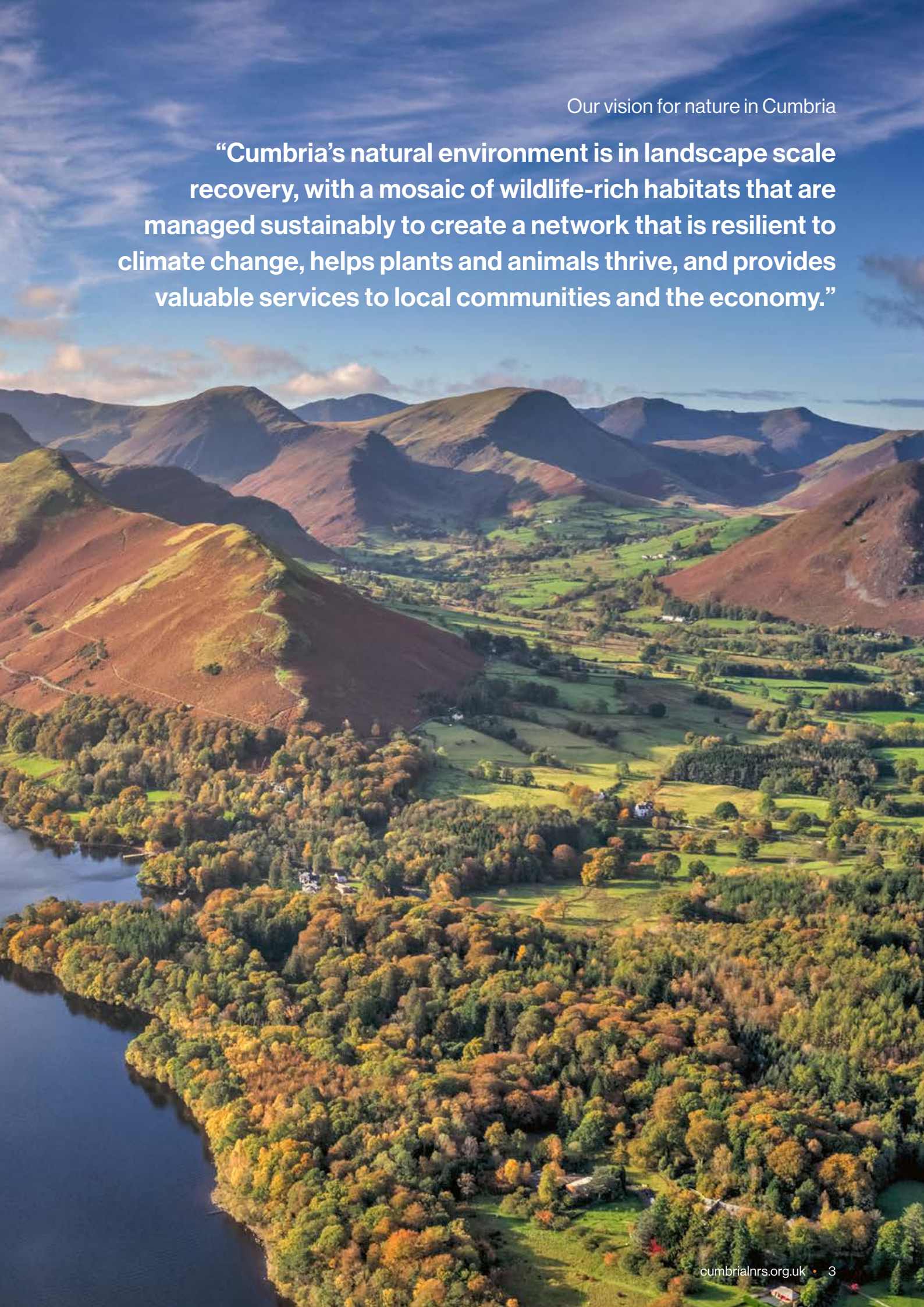
The LNRS has been produced collaboratively by those who live in, work in, or visit Cumbria. It will help us take informed action to create more places where wildlife and people can thrive. Together, we can make a change and create a lasting legacy of nature recovery.

This LNRS was produced with contributions from the following:

- Westmorland and Furness Council, as the Responsible Authority
- the following Supporting Authorities:
  - Cumberland Council
  - Lake District National Park Authority
  - Yorkshire Dales National Park Authority
  - Natural England
- Cumbria Local Nature Partnership, who supported the strategy development throughout
- Cumbria Biodiversity Data Centre, who collated all spatial data and created the Local Habitat Map
- Natural England, Forestry Commission and Environment Agency, who provided technical input to inform this strategy
- Over 650 organisations and interested parties, who engaged with the LNRS either through newsletters and updates, attendance at workshops, or membership of technical working groups
- We would like to thank all those who contributed to the LNRS and everyone who will bring the strategy to life.

Opposite: Derwentwater, Catbells and Newlands Valley

"Cumbria's natural environment is in landscape scale recovery, with a mosaic of wildlife-rich habitats that are managed sustainably to create a network that is resilient to climate change, helps plants and animals thrive, and provides valuable services to local communities and the economy."



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Left: Upland tributary of the River Caldew near Skiddaw House

Introduction

What is a Local Nature Recovery Strategy?

Cumbria is one of 48 strategy areas in England that are required by the Environment Act (2021)[3] to prepare a Local Nature Recovery Strategy (LNRS) for their area, in line with The Environment (Local Nature Recovery Strategies) (Procedure) Regulations 2023[1] and the Local Nature Recovery Strategy Statutory Guidance[2].

The LNRS has been developed to deliver the Nature Recovery Network launched in the UK Government's 25 Year Environment Plan[3], and subsequent Environmental Improvement Plan (2023)[4]. Once combined, these strategies will create a nature recovery network for the whole of England, made up of enhanced, joined up, wildlife-rich places, which will benefit people and nature.

The LNRS sets out **priorities** for nature recovery. It identifies and maps where actions, known as **potential measures**, can have the biggest positive impact. By using evidence, data, expert opinion, and by listening to what's important to people and communities, the LNRS makes it easier to plan and take action at a local level.

There are two elements to the LNRS. This document forms one part (the Statement of Biodiversity Priorities) and should be used alongside the **Local Habitat Map**, which shows where taking action for nature will have the most positive impact. The two parts work together and should be used collectively when informing decision-making.

The LNRS is a strategy for local nature recovery, not a binding delivery plan. It aims to be ambitious yet realistic and sets out priorities to address local environmental pressures and opportunities. **Local nature recovery strategies do not mandate protection or any change in management. Any action needs to be considered against existing legislation and statutory guidance to ensure that any nature recovery efforts are effective and compliant.** The Cumbria LNRS was developed using the best available data and evidence. However, site-specific surveys and local decision-making will be required to ground-truth proposed projects to ensure they are suitable for each location.

Each LNRS will be reviewed every 3 to 10 years to understand progress and refresh targets. It is important that the strategy responds to changing environmental pressures and emerging data and evidence.

1. The Environment (Local Nature Recovery Strategies) (Procedure) Regulations (2023). Available at https://www.legislation.gov.uk/uksi/2023/341/made
2. GOV.UK (2023). *Local nature recovery strategy guidance: what a local nature recovery strategy should contain.* Available at www.gov.uk/government/publications/local-nature-recovery-strategy-what-to-include
3. Department for Environment Food and Rural Affairs (Defra) (2018). *A Green Future: Our 25 Year Plan to Improve the Environment.* Available at www.gov.uk/government/publications/25-year-environment-plan
4. Defra (2023). *Environmental Improvement Plan 2023.* Available at Environmental Improvement Plan 2023 – gov.uk (www.gov.uk).

“Pollinating insects are worth millions of pounds to UK agriculture, and their population declines threaten food production.”

The State of Nature, 2023

Why do we need a LNRS?

England is widely considered to be one of the most nature-depleted countries in the world[5]. We have lost 97% of flower-rich meadows since the 1950s[6], hedgehogs are now an endangered species[7], and 1 in 6 species in Britain are at risk of extinction.

Despite having some wildlife success stories and being a county renowned for its natural assets, biodiversity in Cumbria has declined significantly. This decline is in line with national trends and is continuing. The State of Nature Report[8] published in 2023 highlights an alarming loss of wildlife in England in recent decades:

32 The abundance of **freshwater & terrestrial species** has fallen by **32%** since 1970.

18 The distribution of **invertebrate species** have decreased by an average of **18%** since 1970.

64 Since 1970, **64%** of **flowering plant species** have decreased in distribution.

13 **13%** of species are now classified as threatened with **extinction**.

5. State of Nature Partnership (2023). *State of Nature.* Available at www.stateofnature.org.uk
6. Plantlife (2024). *Restoring Grassland across Britain.* Available at https://www.plantlife.org.uk/protecting-plants-fungi/grassland. red
7. The British Hedgehog Preservation Society (2020). *British hedgehog now officially classified as vulnerable to extinction.* Available at www.britishhedgehogs.org.uk/british-hedgehog-now-officially-classified-as-vulnerable-to-extinction
8. State of Nature Partnership (2023). *State of Nature.* Available at www.stateofnature.org.uk

©Natural England/Philip Ray

Centre: Whitehaven coast
Above left: Moss in Borrowdale, Above right: Curlew

©National Trust Images/Joe Cornish

Buttermere

Using evidence, data, expert opinion, and listening to people and communities, the LNRS recognises those **areas that are already of particular importance for biodiversity**[9]. It also identifies **areas that 'could become of particular importance'.**

This means everyone can make the best decisions for nature where they live and work. It will lead to the creation of "nature-recovery networks" – **bigger, better, and more connected** places that provide a home for wildlife and a healthy environment for people.

By creating more space for nature and connecting habitats in line with the principles outlined by Professor Sir John Lawton in 'the Lawton Report'[10], we can increase the **abundance and diversity of wildlife** and make it easier for everyone to enjoy nature. Taking action for nature recovery is not new to Cumbria. The Cumbria LNRS aims to identify, celebrate, and build on work that has already been done. Every action for nature has to be captured as part of our collective aim.

Urgent action is not just needed for nature. It matters to people too. Friends, families, neighbours, and employees rely on a healthy natural environment. From the peatlands in the Cumbrian uplands that are helping to fight climate change by 'locking away' carbon, to the wetlands that store and slow the flow of water in flood events, **nature helps to protect communities.**

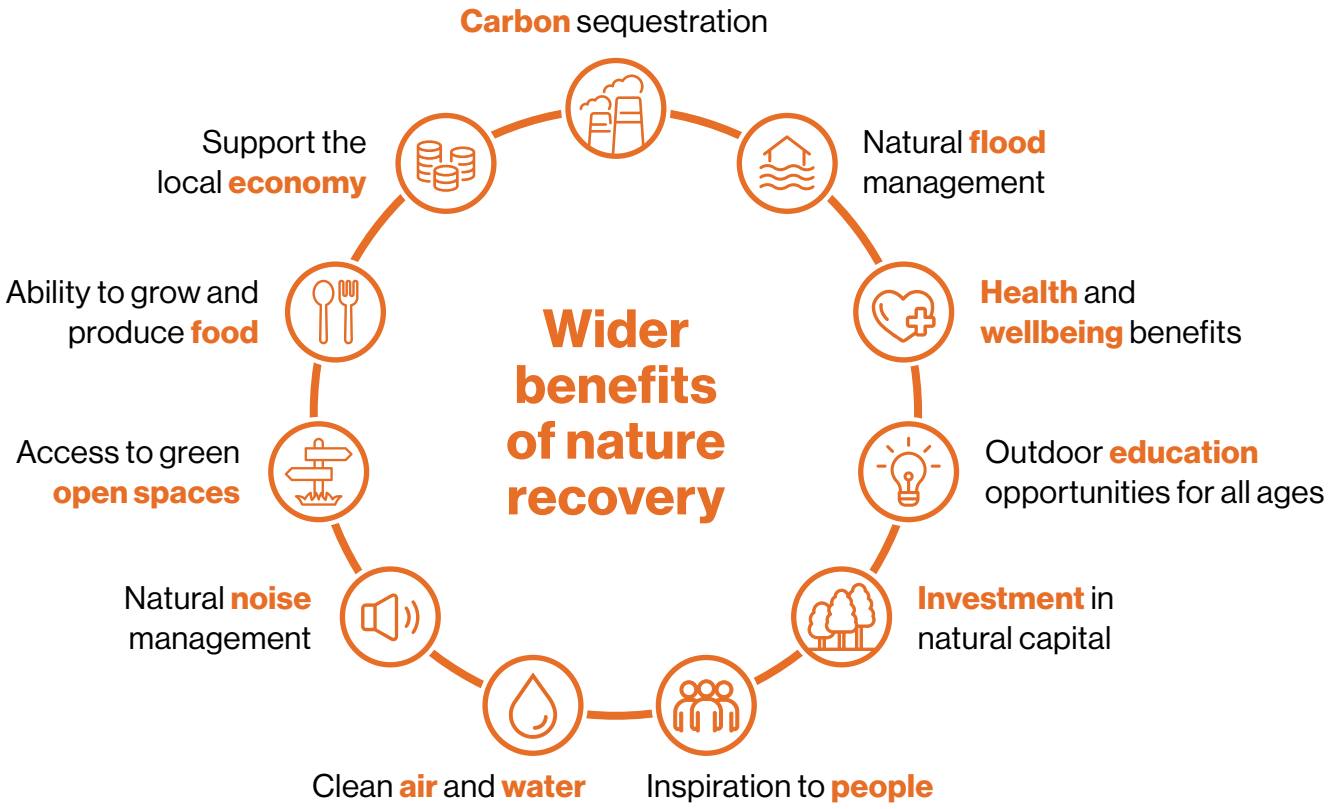
The quality of drinking and bathing waters, levels of pollution in the air, food and water security, and even the temperature on the streets is affected by the condition of the environment.

9. Department for Environment Food and Rural Affairs (2023). Local nature recovery strategy statutory guidance: *What a local nature recovery strategy should contain.* Available at https://assets.publishing.service.gov.uk/media/6421a4bdfe97a8001379ecf1/Local_nature_recovery_strategy_statutory_guidance.pdf
10. Lawton, J. (2010). *Making Space for Nature: A review of England's Wildlife Sites and Ecological Network.* Available at https://webarchive.nationalarchives.gov.uk/ukgwa/20130402170324mp_/http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf

What do we mean by nature recovery?

In general**, nature recovery means to halt or reverse the decline in the number and range of habitats and species.** It often includes restoring natural processes at a landscape scale. This is done primarily by either managing and enhancing existing habitats or expanding and creating new areas of habitat, to support the native species that live there. This could also include specific actions to benefit a particular species, or control invasive non-native species to allow others to flourish.

Trees clean the air, reduce soil erosion, reduce the impacts of flooding, capture carbon, and cool the environment. Healthy, species-rich grassland supports a diversity of plants, fungi, and insects. Healthier soils can reduce erosion and lock away carbon. **To get the most benefits from nature, we need a mosaic of different habitats, across the landscape, that are healthy and functioning in a natural way.**



How can the LNRS be used?

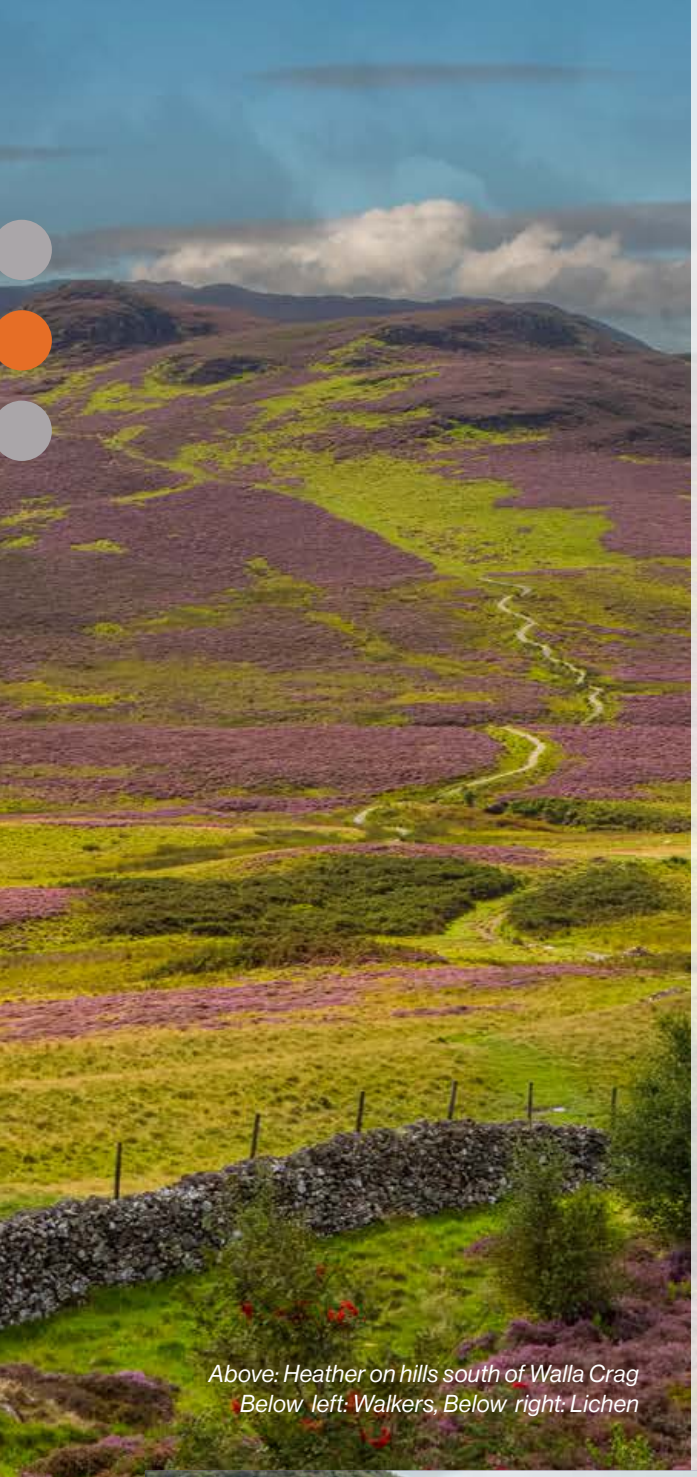
The LNRS is to be used by everyone, from individuals and community groups to landowners, developers, local authorities, government organisations, businesses, and conservation charities. It aims to drive collaborative action for nature and the investment for this to take place. It is also a tool to monitor progress.

The LNRS is a key mechanism for planning and mapping local delivery of the Nature Recovery Network. It aligns with other national and local strategies and plans and contributes to National Environmental Objectives. Where possible, LNRSs align with their neighbouring areas so that the nature recovery network extends beyond our political boundaries to deliver truly landscape scale recovery.

Nature recovery efforts at all scales will contribute towards the Nature Recovery Network.

Cumbria LNRS uses

- **Local planning authorities and other government organisations** should use it to inform policy development, other spatial plans, and statutory duties within the area such as:
  - Local Plans, Minerals and Waste Plans, and Green Infrastructure Strategies produced by the local planning authorities
  - National Park and National Landscape Management Plans
  - River Catchment Management Plans, Diffuse Water Pollution Plans, and River Restoration Strategies
  - public bodies such as Natural England, Forestry Commission, and Environment Agency will use it in discharging their statutory duties
- **Developers** should use it to plan habitat creation and/or compensation as part of their development both on and off site, particularly for Biodiversity Net Gain
- **Private investors** looking for biodiversity and nature-based solutions investment opportunities can use the LNRS to identify potentially ecologically suitable sites
- **Organisations** applying for funding for schemes or projects in their area can use it to demonstrate delivery of an agreed, county wide approach to nature recovery
- **Landowners** can use it to identify opportunities for environmental enhancement on their land. It can also identify revenue opportunities from Environmental Land Management Schemes, forestry grants, or from private investment looking for biodiversity, carbon, or nutrient offsetting opportunities
- **The public, schools, healthcare settings, businesses, and community groups** can use it to take actions in their gardens, workplaces, and community spaces that benefit nature



Above: Heather on hills south of Walla Crag
Below left: Walkers, Below right: Lichen

How is the LNRS structured?

The LNRS has eight habitat or species themed chapters. Each chapter summarises the pressures and threats on that aspect of our biodiversity. We also outline opportunities for nature recovery and the wider benefits they would bring. Each chapter has a vision for nature recovery, gives priorities to show what we want to achieve over the next 3–10 years, and the potential measures, or actions, that could be taken to help achieve our priorities.

Potential measures are listed under each priority. Those listed with a **place marker symbol** can be found on the **Local Habitat Map**. The Local Habitat Map shows areas that are or could become of importance. Measures are mapped where they relate directly to **habitat enhancement, restoration, or creation**. Undertaking that measure in that location would be particularly strategic and deliver maximum benefit for biodiversity and the wider environment. However, areas outside of mapped locations may still be suitable for delivering the measure.

Potential measures listed **without** a place marker symbol are not mapped. This is because they don't directly relate to habitat enhancement, restoration, or creation. Instead, they are equally **beneficial anywhere** across the county, or there is insufficient data to know where they should be mapped. Even if a potential measure is not mapped, it is still an equally important action to support nature recovery.

Cumbria's natural landscape

Cumbria is the third largest county in England (6,768 km²). It has diverse geology, topography, and climate, but with only 73 inhabitants per square kilometre, it is the least densely populated county in England[11].

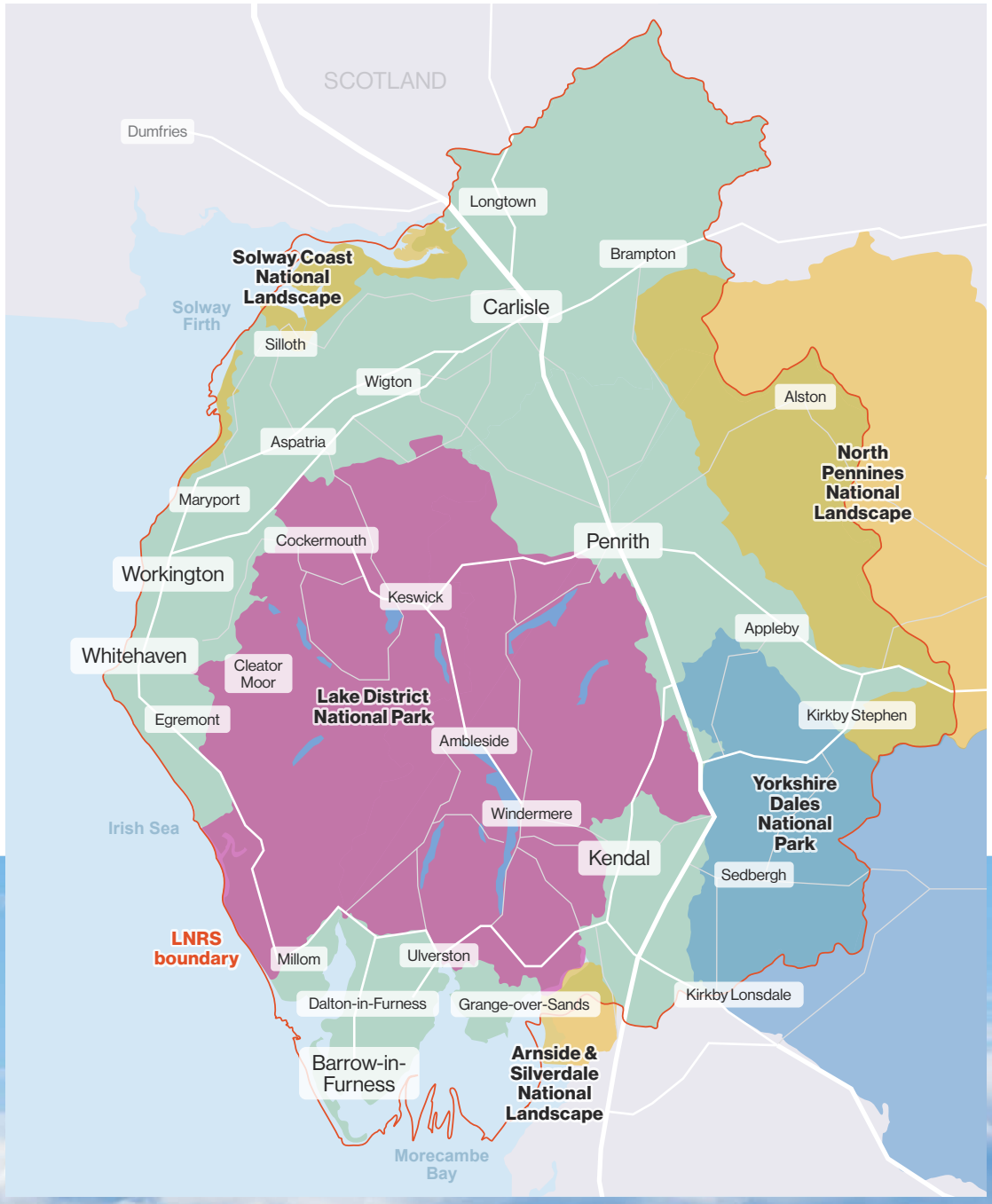
The county is home to a rich variety of **nationally and internationally important habitats and species.** Cumbria's unique landscape is shaped by its geology, soils, and topography. Its natural environment has everything from the summit of England's highest mountain, Scafell Pike, to the coastal and estuarine habitats of the Solway Coast and Morecambe Bay. It includes meadows, limestone pavement, ancient and broadleaved woodland, moorland and montane habitats, and rivers, lakes, and tarns.

The LNRS covers the county of Cumbria, as defined by the administrative boundaries of Cumberland Council and Westmorland and Furness Council. Cumbria includes the **Lake District National Park** and part of the **Yorkshire Dales National Park**. It also includes **Solway Coast National Landscape** parts of **Arnside and Silverdale National Landscape** and the **North Pennines National Landscape**. Cumbria is a special place that deserves care and protection.

11. Cumbria Lord-Lieutenant (N.D.) *Cumbria and is history.* Available at www.cumbria-lieutenant.org.uk/cumbria-and-its-history

Above left: Limestone pavement in Dentdale, Above right: Hadrian's Wall
Below: St. Bee's sandstone cliffs

St Bees Head



The Old Man of Coniston and Dow Crag from Blawith Fells

Cumbria is also divided into **12 National Character Areas** (NCAs). Each NCA has its own 'sense of place' defined by a unique landscape character made up of biodiversity, geodiversity, history, and cultural and economic characteristics. These have shaped (and still shape) the landscape over time through natural and man-made processes and land uses. Summaries of each area's characteristics, features, habitats, species, geology, statistics, other data and statements of environmental opportunities are on the NCA website[12].

Cumbria's Natural Landscapes

2 National Parks
- Lake District
- Yorkshire Dales

3 National Landscapes
- Solway Coast
- Arnside and Silverdale
- North Pennines

2 UNESCO World Heritage Sites
- The Lake District
- Hadrian's Wall

1 UNESCO Global Geopark

12 National Character Areas (NCAs)
- Border Moors and Forests
- Tyne Gap and Hadrian's Wall
- North Pennines
- Eden Valley
- Solway Basin
- West Cumbria Coastal Plain
- Cumbria High Fells
- South Cumbria Low Fells
- Morecambe Bay Limestones
- Howgill Fells
- Orton Fells
- Yorkshire Dales

12. Natural England (2024). *National Character Area Profiles.* Available at www.nationalcharacterareas.co.uk

The county has multiple **designated sites** with special nature conservation status. These are subject to legal protection or are protected through local planning policies. The sites have been designated to reflect the international, national, and county importance of the habitats and species they support, such as freshwater pearl mussel, curlew, and natterjack toad. Cumbria also hosts a number of **irreplaceable habitats**[13] including ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, coastal sand dunes, and lowland fen. These designated sites and irreplaceable habitats are classed as **Areas of Particular Importance for Biodiversity**. Some sites or habitats can have overlapping designations. Information on why a statutory site has been designated can be found on the Natural England Designated Sites View webpage[14].

Cumbria is home to:

- **31** **Special Areas of Conservation** (SAC)
- **3** **Special Protection Areas** (SPA)
- **5** **Ramsar Sites** (wetlands of international importance)
- **288** **Sites of Special Scientific Interest** (SSSI)
- **26** **National Nature Reserves** (NNR)
- **10** **Local Nature Reserves** (LNR)
- **1617** **County Wildlife Sites** (CWS)
- **1** **Marine Conservation Zone** (MCZ)
- **1** **Highly Protected Marine Area** (HPMA)

13. HM Government (2024). *Irreplaceable habitats: How biodiversity net gain (BNG) applies to irreplaceable habitats.* Available at www.gov.uk/guidance/irreplaceable-habitats
14. Natural England. *Designated Sites View.* Available at www.designatedsites.naturalengland.org.uk/SiteSearch.aspx

Ulverston from Hoad Monument

Allonby Bay

In addition to land-based designations, Cumbria has one **Marine Conservation Zone** (MCZ) which overlaps with the LNRS area. The Cumbria Coast MCZ stretches approximately 27 km along the coast of Cumbria, from south of Whitehaven, around the cliffs at St Bees Head to the mouth of the Ravenglass estuary[15]. MCZs protect typical, rare or declining habitats and species found in our seas. Cumbria also has one of England's first **Highly Protected Marine Areas** (HPMA), designated at Allonby Bay in 2023. These are areas of the sea including the shoreline that allow the protection and full recovery of marine ecosystems.

Most of Cumbria's rural landscape is managed by farmers and private landowners. However, significant areas are owned by public bodies (e.g. the Ministry of Defence, United Utilities and Forestry England), or conservation bodies (like the National Trust and Cumbria Wildlife Trust). **Whilst Cumbria is predominantly rural, there are several urban areas.** These include the city of Carlisle, and the towns of Barrow-in-Furness, Ulverston, Kendal, Keswick, Penrith, Appleby-in-Westmorland, Maryport, Workington and Whitehaven amongst others. Urban parks, gardens, and other public green spaces also provide important habitat that can support biodiversity.

Alongside Cumbria's natural land and seascape, the area is also important for engineering and manufacturing, energy, food production, forestry, tourism, and culture and heritage. So it is unsurprising that alongside the **500,000 people who call Cumbria home**, many visitors enjoy spending time in Cumbria's natural landscape. Over **42 million people came to the county in 2023**[16] primarily to visit a lake, the countryside, or to go walking. Five of

15. GOV.UK (2019). *Marine conservation zones: Cumbria Coast.* Available at https://www.gov.uk/government/publications/marine-conservation-zone-2013-designation-cumbria-coast
16. Cumbria Tourism (2023). Available at www.cumbriatourism.org/resources/research

the UK's National Trails cross our county including the Pennine Way, Pennine Bridleway, Hadrian's Wall Path, King Charles III England Coast Path and the Coast-to-Coast Path.

A survey conducted to gather views on nature in Cumbria received 786 responses. This exemplified how important Cumbria's natural landscape is to local people and visitors. **It is widely documented that nature brings wider benefits to people** but when asked why spend time in nature, participants responded that they do so to enjoy natural beauty (81%), to exercise (59%) and to improve mental health (51%). Other responses mentioned farming, angling, volunteering, photography, and for socialising. All responses show the importance of creating and maintaining sustainable places and spaces for people and wildlife.

Below left: Start of the C2C bike route in Whitehaven, Below right: Walker at Derwent Water

Appleby-in-Westmorland

Overarching pressures, opportunities, principles, and priorities

Pressures on our current biodiversity

The reasons for the decline in biodiversity are often multi-faceted and complex. We have identified four overarching pressures that are causing the decline and fragmentation of species and habitats across Cumbria, or are reducing the ability of ecosystems to maintain their current state:

- **Human activity**
- **Land use**
- **Resources and funding**
- **Climate change**

Opposite: Sedburgh, Below left: Herdwick sheep in Great Langdale
Below right: Walking group near Watendlath Tarn

Bowness-on-Windermere

▶ Human activity

Human activity has had **considerable impact on the natural environment** and the wildlife it supports through the way society has developed and how we live our lives. Fortunately, with increased awareness, changes to policy, and a range of environmental grants and incentive schemes, there is the opportunity for things to change for the better.

Whilst it is rare for people to intentionally harm our natural environment, **unintentional harm** to wildlife is an issue across Cumbria. Inappropriate human activity is leaving its mark on the landscape and negatively affecting biodiversity. Often this is due to a lack of awareness or education around the risks and issues. These can include **recreational disturbance** such as off-lead dogs, drones, or people walking too closely to wildlife during breeding and nesting seasons[17]. They can also include inappropriate/unpermitted recreation such as increased and inappropriate access to areas that contain sensitive species or habitats, and damage to habitats and species from human-caused wildfires.

Humans have also introduced over 2,000 non-native species to the UK[18]. Although the majority of these are harmless, around 10% have spread and become invasive, impacting the environment, the economy, and our health. Cumbria has several **invasive non-native species** (INNS).

17. Cumbria Wildlife Trust (2023). *Visitors to South Walney urged not to disturb birds during nesting season.* Available at www.cumbriawildlifetrust.org.uk/news/visitors-south-walney-urged-not-disturb-birds-during-nesting-season
18. Animal and Plant Health Agency (2023). *Invasive species: the silent threat to our ecosystems.* Available at https://www.daera-ni.gov.uk/topics/protect-environment/effects-air-pollution-natural-ecosystems

Rhododendron on Muncaster Fell

These have a negative impact on habitats and species by outcompeting native species for limited resources or spreading diseases that reduce our native species populations. Key INNS in Cumbria include mink, signal crayfish, grey squirrel, New Zealand pygmyweed, rhododendron, and Himalayan balsam.

Air, water, noise, and light pollution can also negatively affect habitats and the species they support. Some habitats and certain plant species are particularly sensitive to **air pollution** from combustion, vehicle emissions, pesticides, and agriculture. The deposition of nitrogen is particularly an issue in certain low-nutrient habitats such as bog, heath and montane habitats, sand dunes, and lakes. It can cause enrichment, reduce plant species diversity, and alter their species composition and ecosystem function[19].

Water pollution from chemicals, sediment, and high levels of nutrients can negatively affect the condition of aquatic habitats, and poison or suffocate aquatic species. As our freshwater systems run from the highest mountains to the sea and connect all our different habitats, a reduction in their condition ultimately affects the entire food chain. **Artificial lighting** is often installed in our built environment to improve access and safety for people. However it can have an adverse impact on species because it disturbs the way plants and animals perceive daytime and night-time, disrupting their natural behaviour[20].

▶ Land use

Cumbria's land-based industries are a significant part of the local economy and help define the landscape. Effective connectivity of habitats and the movement of species across the county depends upon **sustainable land management and planning practices**. We must meet the needs for those who live and work in or visit Cumbria, as well as our habitats and species. Cumbria's land is increasingly under pressure to meet these needs, resulting in habitat loss and fragmentation, with less space for species to feed, shelter, breed, and move:

- **new developments** are needed to provide local housing, industry and infrastructure, and economic growth
- **forestry** requires land for timber production
- land is needed for **food production** to maintain food security
- **utility companies** need land for renewable electricity generation, water storage, extraction and purification
- Cumbria's popularity as a **tourist destination** means recreational use of the landscape for a variety of activities such as walking, running, cycling, climbing, swimming, and boating
- our **road and rail networks** are needed to transport people and goods around the county
- **canalisation** of our waterways was carried out in the past to increase the productivity of adjacent land

Although our land is trying to meet competing priorities, **it is still possible for nature recovery to happen in the right place alongside food and timber production and a thriving local economy.** The owners and managers of Cumbria's land could bring a significant influence and contribution to landscape scale nature recovery.

19. Department of Agriculture, Environment and Rural Affairs (2023). *Effects of air pollution on natural ecosystems.* Available at www.daera-ni.gov.uk/topics/protect-environment/effects-air-pollution-natural-ecosystems
20. Friends of the Lake District (N.D.) *Dark Skies Cumbria: How light pollution impacts wildlife.* Available at https://www.friendsofthelakedistrict.org.uk/news/guest-blog-how-light-pollution-impacts-wildlife

Upland hay meadow in Dentdale

Where land managers take actions that support nature recovery, and/or the associated wider benefits, they may be able to receive environmental land management payments for doing so which will financially support their wider business.

▶ Resources and funding

One of the main barriers preventing nature recovery at a landscape scale in Cumbria is the current level of data, funding and resource, and the way it is allocated. Landscape scale nature recovery will only be successful with **long-term funding and investment** for habitat creation, management, data recording and processing, and monitoring. Investment is also needed to build a skilled and environmentally-aware local workforce across sectors to deliver projects at scale for multiple benefits. In turn, this will support the local economy.

Whilst there is already lots of good work happening to aid nature recovery in Cumbria, barriers to **data and knowledge sharing** means that is not always easy to see the bigger picture. Limited data on the condition of our habitats and species means it is difficult to accurately assess the current condition of our natural environment or meaningfully measure change.

▶ Climate change

Climate change is the long-term change in temperature and weather patterns. The UK is already experiencing **warmer temperatures, sea level rise, longer periods of drought, and more intense, heavy rainfall**. Scientists predict that by 2100, temperatures could increase by up to 4°C, and sea levels could rise by up to one metre compared to 1900 baseline data[21]. This will have a significant impact on Cumbria's habitats and the species that live here, many of which are already **vulnerable to environmental changes**.

Temperature increases could cause **changes in distribution** of habitats and species. This could result in species migration where certain species may no longer survive in lower altitudes or latitudes. Many of our current species, some of which are iconic and already rare in the UK, may not survive as their habitats are reduced or become inhospitable.

21. The Climate Change Committee (2020). *How much more climate change is inevitable for the UK?* Available at www.theccc.org.uk/2020/04/21/how-much-more-climate-change-is-inevitable-for-the-uk

UK Climate Projection[22] estimations

- The average **UK temperature** has increased by **0.8°C** between 1961 and 1990
- By 2050 there could be a **65%** chance of a summer as **hot as 2018**
- The UK has seen a **16 cm sea level rise** since 1900
- **Summer temperatures** could be up to **7.4°C** hotter by 2050, while **winter temperatures** could be **4.4°C** hotter
- By 2100 **summer rainfall** could decrease by **62%**
- There could be up to **59%** more **precipitation in winte**r by 2050
- In 2020 there were **5.2 million homes and businesses** at **risk of flooding**
- Up to **1.15 m sea level rise** by 2100

22. Met Office (2022) *UK Climate Projections (UKCP18).* Available at https://www.metoffice.gov.uk/research/approach/collaboration/ukcp

This is particularly pertinent to the species that inhabit our mountainous areas, as they are adapted to cooler conditions and already restricted to our highest mountaintops. Warmer temperatures may also introduce **new species** from further south as they migrate northwards, and some of these could be invasive or harmful to our existing wildlife, including pests and diseases.

Sea level rise will cause the **loss or deterioration of natural habitats** along our coastlines. Many coastal habitats are prevented from migrating inland due to natural or artificial barriers, known as coastal squeeze[23].

More extreme weather will increase the risk of drought, **reduce river levels and flows,** and put increasing pressure on freshwater wildlife. It will also reduce the water available for communities and industry. Peat habitats across Cumbria could increasingly dry out,

23. BirdLife International (2024). *Sea level rise poses a major threat to coastal ecosystems and the biota they support.* Available at https://datazone.birdlife.org/sea-level-rise-poses-a-major-threat-to-coastal-ecosystems-and-the-biota-they-support

Haweswater in drought

releasing thousands of tonnes of carbon into the atmosphere and accelerating the effects of climate change. Drought can also cause **wildfires**, causing damage to Cumbria's important habitats and killing the species that inhabit them. Wildfires can also pose a risk to human health and built infrastructure.

Extreme weather could also bring **intense and sudden rainfall.** With that comes a heightened risk of more frequent flooding that persists over a longer period. More frequent and severe flooding can not only destroy or cause damage to habitats and species, but is a huge risk to homes, businesses, and infrastructure. The cost of the flooding caused across Cumbria by Storm Desmond in 2015 was estimated to be £1.3 billion[24].

Opportunities for nature recovery and wider benefits

Increasing the amount of space for nature at a landscape scale, ensuring habitats and species can function as naturally as possible, and sustainably managing them, would bring wide reaching benefits to both nature and people. The effective **creation, restoration or enhancement** of our habitats, increased connectivity, and the **management or reduction of pressures** (including recreational disturbance, and the eradication or management of INNS) will make our county more resilient to the impacts of climate change. It will also allow habitats to be dynamic to changing local conditions and native species to move freely throughout the landscape.

Most species require a range of resources and well-connected habitats in good condition to complete their life cycle and maintain sustainable populations. Therefore, managing our landscape as a **mosaic of different habitats** at a range of scales is critical to enabling native species to thrive[25].

The government's Environmental Improvement Plan identifies two key national environmental objectives that relate to the protection, restoration, and creation of wildlife-rich habitat.

24. BBC (2019.) *Storm Desmond: Study says flood was 'largest in 600 years'*. Available at www.bbc.co.uk/news/uk-england-cumbria-48351653
25. Natural England (2013). *The Mosaic Approach: Managing Habitats for Species.* Available at https://publications.naturalengland.org.uk/publication/6415972705501184

River management and flood plain reconnection at Brotherswater

Watersports at Talkin Tarn Country Park, near Carlisle

These are to:

- **restore 75% of terrestrial and freshwater protected sites to favourable condition by 2042** (with 50% on track to achieve favourable condition by 2028)
- **restore or create more than 500,000 ha of wildlife-rich habitat by 2042** (with an interim target of 140,000 ha by 2028), **alongside our international commitment to protect 30% of our land and ocean by 2030**

'Wildlife-rich habitat' is a term with specific definitions. It refers to either priority habitat that appears under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, or habitat that is listed on Schedule 1 of the Statutory Instrument for The Environmental Targets (Biodiversity) (England) Regulations 2023. Wildlife-rich habitat should also meet the condition requirements outlined in the Natural England Technical Information Note '*TIN219: Environment Act Habitat Target – Definitions and Descriptions*' (2024)[26].

The first step towards nature recovery is ensuring that our Areas of Particular Importance for Biodiversity are **protected, enhanced**, and pressures on them are reduced. They form the core of our nature recovery network. Our most important sites for biodiversity already provide a range of benefits to people, including:

- **natural flood management** – longer, rougher, and deeper-rooted vegetation slows down surface water flow and increases infiltration and evaporation
- **improved water flows** – where more water is retained for longer in the catchment, the supply of water is more consistent during periods of drought
- **improvements to water quality** – natural habitats around watercourses can absorb nutrients and other pollutants, preventing them from entering water bodies
- **absorption of carbon** – vegetation, trees, and healthy soils and peat absorb carbon, removing it from the atmosphere
- **improvements to air quality** – trees and other vegetation can absorb ammonia and capture particulate matter on their leaves and form a physical barrier between pollution sources and sensitive habitats
- **enhancement of our health and wellbeing** – access to nature is good for us
- **economic benefits** – a healthy environment attracts investment

26. Natural England (2024). *Environment Act Habitat Target – Definitions and Descriptions (TIN219).* Available at https://publications.naturalengland.org.uk/publication/6427187599900672

Tree planting in the upper catchment of the River Eden

By expanding and connecting the areas that are already wildlife-rich, we can maximise the benefits for biodiversity. We can also balance other land use needs in our landscape and maintain the benefits to people. For example, nature-friendly or low-input farming can make farms more sustainable and profitable, **improve soil health**, reduce the amount of sediment and nutrients going into our land and water[27] whilst also creating space for nature and allowing biodiversity to recover. Investing in nature can **support the local economy**, inspire people to reconnect with nature, whilst also improving the condition and extent of habitats in Cumbria.

Involvement in community-based nature recovery projects can bring **better physical and mental health**. It can create a sense of belonging and community spirit[28]. It's also an opportunity for people to learn about the pressures that the natural environment is facing and **feel empowered** to play their part in its recovery. Education also brings the opportunity for **widespread behaviour change** to reduce the impact of recreational disturbance, prevent the introduction and spread of invasive species, pollution, and wildfires.

There are also multiple opportunities for financial investment in Cumbria to deliver nature-based solutions. These solutions provide wider benefits as well as nature recovery at a landscape scale. This includes emerging **green finance** opportunities such as Biodiversity Net Gain. A nature recovery network across Cumbria would help to provide people with **greater access** to areas with high nature value. This would encourage people to be more physically active and spend time outdoors. In turn, this can reduce the health burden on the NHS and local services.

Investment in **upskilling people** across different sectors to manage, monitor, and care for our habitats and species will help to deliver a joined up approach to nature recovery. By making the most of our existing resources, pooling them together to deliver maximum benefit in areas which **data and evidence** suggest could become particularly important for biodiversity, we can provide wider benefits to the people of Cumbria for generations to come.

27. Upland Farmer Toolkit (2024). *Low-Input Farming.* Available at https://uplandfarmertoolkit.org.uk/farming/low-input-farming
28. Mind (2021). *Nature and Mental Health.* Available at www.mind.org.uk/information-support/tips-for-everyday-living/nature-and-mental-health/how-nature-benefits-mental-health

Right top: Boy fishing in the Lake District, Middle: Sedburgh woodland, Bottom: Spring Gentian

Principles for nature recovery

There are several common principles that should be followed if the LNRS is to be successful in delivering nature recovery at scale. These principles apply to all priorities and potential measures, across all habitat types.

1 Follow policy, guidance, and good practice

All delivery must comply with up-to-date **legal requirements and regulatory policy,** and should follow standards, guidance, and good practice as they are updated. The LNRS **does not confer permission** to create or restore habitat without following appropriate existing decision-making frameworks, consultation, permissions, permits, or licenses. The LNRS does not circumvent standard **pre-existing procedures or good practice** around habitat creation, restoration, or enhancement.

2 A strategy to guide delivery

Whilst the strategy should be used to guide the delivery of nature recovery, all individual projects need to be informed by the relevant **site-specific field surveys**. A detailed **delivery plan** should be developed for each project, based on what works best for that area of land. The Local Habitat Map should be **interpreted flexibly**, so as not to exclude actions where subsequent field data indicates they would be appropriate.

3 Right habitat, right place

Any **habitat restoration or creation measures** should be undertaken on suitable sites and should not be to the detriment of other existing wildlife-rich habitats or species. The **most beneficial actions** for each place should be chosen, favouring habitats and species recognised (nationally and locally) as the highest priorities for action over those that are common and widespread. **Expert advice** should be sought to inform this.

4 Know your site

Before taking action, **gather information** on the existing habitats, species, geology, soil, historic environment, unique landscape characteristics present, and their requirements. This should be done via existing records searches, field surveys, expert advice, and online information such as **National Character Area** data and **Landscape Character Assessment** data. Use this site-specific information to inform your choice of action.

5 Think long-term

Any action for nature recovery should **plan proactively** for long-term habitat management, maintenance, and funding.

6 Be ambitious

Any action for nature recovery should work towards restoring natural processes at a landscape scale, achieving well-functioning habitats that are in **good ecological condition** and that support sustainable, **resilient populations** of species.

7 Build resilience

Any action for nature recovery should consider **pressures** such as climate change, pests and diseases, and human disturbance. Actions should also have **resilience** to these pressures built into their design and management.

8 Maximise multiple benefits

Action for nature recovery should be designed to **deliver wider benefits**. These could include improving health and wellbeing, capturing carbon, reducing flood risk, or sustaining traditional cultural land management.

9 Collaborate with communities

Aim to **work collaboratively** from the outset with local residents, communities, partnerships, and businesses.

10 Consider access

Where it is not detrimental to the target habitats and species, action for nature recovery should support better access to **nature for people** and communities where public safety and landowner willingness allows.

11 Monitor success

Any action for nature recovery should include monitoring or tracking progress. This is critical to **understanding the success** of efforts.

12 Support landowners and managers

Any action for nature recovery should support and **work in partnership** with landowners and land managers. The actions in the LNRS are not binding for the landowner or land manager. Owners and managers of the land identified are **not required** to make any changes.

13 Share knowledge

Any data collected as part of action for nature recovery should be shared with **Cumbria Biodiversity Data Centre**.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Priorities and potential measures for nature recovery

The priorities and measures identified in the LNRS were collectively agreed by a wide range of stakeholders. They have been developed using national environmental objectives, national and local strategies and plans, guidance notes, research papers, data, and local knowledge.

Where priorities have a numerical target, these values were set using national environmental objectives, local or regional targets in other strategies and plans, local organisational targets, and the Local Habitat Map. Targets were set to be locally relevant, achievable yet ambitious, and to align with national targets.

The following enabling priorities and potential measures have been identified as being a critical part of nature recovery. They are overarching actions that will be needed to address the local pressures on the natural environment that extend beyond the enhancement, restoration, or creation of habitat. They apply to all habitats and species and will be required across the county if we are to achieve our vision for nature recovery in Cumbria.

Priority 1: **Habitat mosaics**

More of our environment managed at a landscape scale, providing space for the full range of naturally occurring habitats and species to flourish as part of connected, structurally diverse and dynamic mosaics.

Instead of requiring specific measures, this priority should be achieved by applying the following principles when delivering any aspect of the LNRS:

- any management on a given parcel of land should achieve a well-functioning ecosystem that supports a full range of naturally occurring habitats and species
- all components of habitat mosaics should be enhanced, restored or created as appropriate to the geology, soil and climatic conditions of the location by focusing on restoring natural processes
- any action for nature recovery should plan proactively for long-term management at a range of scales (including livestock grazing, deer, hydrology, invasive species, and recreation)
- the Local Habitat Map should be interpreted with its limitations in mind. Do not exclude actions where subsequent field data indicates they would be appropriate. Avoid undertaking actions that site surveys show would be damaging
- action for nature recovery should focus on restoring natural processes using the five pillars of natural function (hydrology, nutrients, soil and sediment processes, vegetation management, species composition)

Left top: Walney Island, Middle: Family planting tree, Bottom: Sundew

Priority 2: **Invasive non-native species**

Halt the spread and reduce the extent of invasive non-native species (INNS) in Cumbria, prevent the arrival of new INNS, and where possible eradicate specific INNS from target catchments/areas.

O1 Work with local landowners and stakeholders to develop and implement coordinated management plans for the strategic reduction/eradication of key INNS, which also consider the impacts of climate change on species distribution.

O2 Reduce the risk of the introduction/spread of INNS, and the diseases they can carry, by encouraging greater implementation of effective biosecurity measures, through:

- education
- engagement
- signage
- targeted risk reduction
- working with event organisers
- raising awareness of good practice guidance

O3 Develop a coordinated approach for sharing monitoring/surveillance data on INNS, by developing emergency action plans, to allow for a rapid response to the spread of existing or introduction of new INNS.

Priority 3: **Data and mapping**

Improve Cumbria's data for habitats and species including habitat type, extent, and condition, to monitor and support the delivery of the LNRS and other associated nature recovery projects.

O4 Identify, survey, and manage data with an emphasis on updating baseline information on existing and potential County Wildlife Sites including:

- habitat type
- extent
- condition
- management status
- abundance and diversity of species supported by that habitat
- geology and soil type

O5 Establish a standardised and consistent data reporting method for wildlife-rich habitats and species.

O6	Establish a standardised and consistent approach to long-term monitoring practices to ensure consistency in data collection.
O7	Support the role of Cumbria Biodiversity Data Centre as a central resource, targeting: • improving systems to allow for the gathering, sharing, verifying, and updating of data and GIS records between organisations and citizens • developing robust data-sharing agreements • maximising the use of existing data sources and local knowledge
O8	Develop guidance and provide training to increase the coverage, quantity, and quality of data collected through citizen science projects that: • foster community ownership • contribute meaningfully to species and habitat data collection
O9	Carry out research and development into the feasibility and resilience of proposed projects for nature recovery.

Priority 4: **Safeguarding our habitats and species**

Safeguard existing 'Areas of Particular Importance for Biodiversity', 'Areas that Could Become of Particular Importance', and LNRS priority species through a range of approaches such as appropriate local planning processes, guidance, and land management incentives.

O10	Safeguard 'Areas of Particular Importance for Biodiversity', and where possible and appropriate, 'Areas that Could Become of Particular Importance' and LNRS priority species by incorporating them into local planning policy.
O11	Enable enforcement of protections through effective planning, monitoring, and reporting processes.
O12	Survey, monitor, and identify more areas in need of safeguarding through designation such as: • Bathing Waters • Limestone Pavement Orders • County Wildlife Sites • Local Geological Sites

O13 Protect sensitive habitats against the impacts of recreational pressure by:

- utilising partnership working to ensure consistent messaging
- funding wardens and engagement officers
- providing access management including fencing, groundworks, and considering the use of public space protection orders
- providing training
- delivering footpath improvements
- promoting responsible recreational behaviour
- considering of the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites
- providing education on dangers of wildfire

Priority 5: **Skills, delivery, and funding**

Increase investment in funding and resource to enable the long-term delivery of nature recovery, including skills and education, and long-term management and monitoring.

O14 Identify skills and knowledge gaps and create more opportunities to access the sector (building the skill base of future generations), through:

- training
- apprenticeships
- career opportunities

O15 Promote and encourage outdoor and nature-based learning.

O16 Continue to develop opportunities for sharing good practice and lessons learnt. Encourage and support collaboration by supporting and delivering joint training and knowledge exchange between:

- farmers
- land managers
- foresters
- conservation bodies
- other organisations
- individuals

O17 Invest in community capacity and skills, and economic/human capital development to support the management and monitoring of habitats and species in line with the LNRS.

O8 Develop guidance and provide training to increase the coverage, quantity, and quality of data collected through citizen science projects that:

- foster community ownership
- contribute meaningfully to species and habitat data collection

O9 Carry out research and development into the feasibility and resilience of proposed projects for nature recovery.

Priority 6: **People taking action for nature**

More people from all sectors of society taking positive action for wildlife, and engaging with nature through responsible recreation, volunteering, and learning.

O18 Engage, empower, and build capacity for a more diverse and wider cross section of society to take action, enjoy, and care for Cumbria's natural environment. Raise awareness of:

- our heritage
- biodiversity
- wider benefits
- how to protect and enhance it

O19 Create more practical opportunities for people to take action for nature recovery, increasing the range, diversity, and scale of volunteering opportunities, and embedding these in green social prescribing.

O20 Encourage nature-friendly practices in gardens, allotments, and community spaces, including:

- pollinator-friendly planting
- leaving grass long by reducing mowing
- using peat-free compost
- reducing pesticide and herbicide use
- creating holes in fences that allow wildlife such as hedgehogs to move between different spaces
- retaining and maintaining hedgerows
- leaving some areas to be 'wild'
- minimising the impacts our pets have on local wildlife

O21 Raise awareness of issues and actions everyone can take, such as:

- "love my beach"
- clean water campaigns
- reducing water use
- reducing impacts of access and recreation
- increasing flood and drought resilience
- reducing and removing litter
- improving biosecurity
- disposing of items such as wet wipes or cooking fats correctly
- using sensitively designed lighting in gardens
- reducing inputs of medication, pesticides, and biocides into the environment

O8 Develop guidance and provide training to increase the coverage, quantity, and quality of data collected through citizen science projects that:

- foster community ownership
- contribute meaningfully to species and habitat data collection

O13 Protect sensitive habitats against the impacts of recreational pressure by:

- utilising partnership working to ensure consistent messaging
- funding wardens and engagement officers
- providing access management including fencing, groundworks, and considering the use of public space protection orders
- providing training
- delivering footpath improvements
- promoting responsible recreational behaviour
- considering the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites
- providing education on dangers of wildfire

O16 Continue to develop opportunities for sharing good practice and lessons learnt. Encourage and support collaboration by supporting and delivering joint training and knowledge exchange between:

- farmers
- land managers
- foresters
- conservation bodies
- other organisations
- individuals

Priority 7: **Farming and nature**

More farmland managed to regenerate soils, incorporate thriving wildlife-rich habitats, and improve water quality, contributing to High Nature Value farming systems that produce food and fibre and sustain rural culture and communities.

Farmers have a hugely important contribution to make to nearly all the habitats and species in Cumbria. All the potential measures in the habitat themed sections could be suitable on farmed land. The measures outlined below are those that could be applied anywhere within the farmed landscape and could be carried out alongside production. **Measures which cover the enhancement, restoration, or creation of specific wildlife-rich habitats within the farmed landscape are listed under the relevant habitat priority.**

O22

Safeguard, maintain, enhance existing, and create new farm landscape features which support biodiversity, such as:

- traditional hay meadows
- low input grassland
- ponds
- field trees, especially ancient and veteran trees
- drystone walls
- farm woodland
- hedgerows and hedgerow trees
- rough margins and scrub

O23

Make more space for nature within the farmed landscape, with habitats created/enhanced to expand and connect with nearby wildlife-rich habitats.

O24

Encourage regenerative farming methods that improve soil health, including:

- carrying out soil assessments and testing to understand soil structure, soil organisms, organic matter, and nutrient status
- producing soil management plans
- exploring new grazing regimes
- using legume crops in arable rotations
- adding suitable species swards in species-poor grassland
- minimising soil disturbance
- robotic weeding

O25 Tackle diffuse pollution and sediment runoff by taking a catchment approach to low-input farming methods, including:

- education and farmer learning
- nutrient management plans
- diffuse water pollution plans
- land use change
- sustainable slurry management
- improved soil management
- grazing and vegetation management
- prevention of unnatural erosion

O26 Create new food, shelter, and nesting opportunities on arable land and productive grasslands, such as:

- nesting plots for birds
- beetle banks
- sowing bird and pollinator friendly seed mixes
- leaving rough margins and scrub

O27 Improve air quality and tackle ammonia losses by interventions such as:

- planting shelterbelts next to livestock housing
- covering farmyard muck heaps
- managing slurry sustainably

O28 Establish wildlife-rich agroforestry, promoting the use of climate change resilient native tree species, including options such as:

- in-field trees
- wood pasture
- wildlife-rich hedgerows and hedgerow trees
- shelterbelts
- riparian buffers
- traditional orchards, including native fruit and nut tree species to benefit farmland species

O29 Explore water management and wetland farming innovations where the management of wet areas needs to be balanced with food production, including:

- rewetting peaty soils
- managing wet grassland for breeding waders (generally with cattle grazing)
- managing water levels to protect and enhance lowland raised bog and other wetlands
- maintaining low nutrient inputs to protect wetlands

- creating wet woodland as part of farming systems
- creating floodplain meadows

O30 Explore innovative approaches to farming and forestry that minimise plastic use.

W6 Create more woodland and tree cover (if supported following application of open habitats policy, wader guidance, and the peatland decision support framework), targeting the following wildlife-rich woodland types:

- upland oakwood and 'Atlantic rainforests' (in gills, fellsides/moorland edges, and where bracken is dominant
- wet woodland (targeting floodplains, riparian zones, and plateaus)
- lowland yew on limestone and upland ashwood
- future wood pasture and parkland and ancient/veteran trees
- traditional orchards
- mixed and broadleaved woodland in good condition

W15 Manage existing hedgerows to be wildlife-rich by:

- maintaining them in a variety of heights, conditions, and widths (including tall and wide hedges, those that include standard trees, and those that can flower and fruit abundantly)
- maintaining buffer strips either side
- planting up gaps in hedges with a mix of climate change resilient native species that are of local or appropriate, more southerly provenance
- planting hazel, blackthorn, bramble, and honeysuckle to benefit dormice
- timing cutting to avoid disturbance to breeding birds, and if likely to be present, dormice
- carrying out appropriately timed traditional hedge laying

W16 Plant species-rich native hedgerows (including standard trees) to create a connected and diverse network, with an emphasis on:

- restoring historical field boundaries
- replacing fences with hedgerows
- maintaining enclosures and field patterns with historical value

F5 Establish wide riparian buffer strips of wildlife-rich habitats where livestock can be excluded, in suitable areas, to minimise nutrient and sediment input into watercourses, water bodies, and wetlands.

Woodlands, trees, and scrub

Habitats

The habitat group of 'woodlands, trees, and scrub' is made up of the following wildlife-rich habitats:

- **Lowland mixed deciduous woodland, lowland beech and yew woodland, upland oakwood, upland mixed ashwoods, upland birchwoods, wet woodland, wildlife-rich native broadleaved woodland, and wildlife-rich mixed woodland**
- **Traditional orchards**
- **Wood pasture and parkland**
- **Hedgerows**
- **Wildlife-rich scrub and bracken**
- **Other woodland and trees**

This habitat group also considers bracken, coniferous woodland, and trees outside woodlands.

There is approximately 90,000 ha of woodland and trees in Cumbria, covering just over 13% of the county. Around 62% is broadleaved woodland, 27% is coniferous woodland, and 11% is trees outside woodland such as wood pasture and parkland, and traditional orchards.

Opposite: View from Loughrigg Fell
Below left: Tree planting above Watendlath, Below right: Hazel dormouse

Approximately 17% (16,000 ha) of the woodland in Cumbria is classed as **ancient woodland** and considered to be **irreplaceable habitat**. Of this, 60% is **ancient semi-natural woodland.** Ancient semi-natural woodlands are our best woodlands for wildlife. The type of woodland found (for example upland oakwood or wet woodland) reflects soil conditions, climate, altitude, and past and current management. Some plants, such as dog's mercury, wood sorrel, and wild garlic, are associated with ancient woodland, and along with other 'indicator' species, help to identify this type of woodland.

The highest densities of **semi-natural broadleaved woodland** are in the south and west of the county. The majority of Cumbria's broadleaved woodland are found within the NCAs of the Cumbria High Fells and the South Cumbria Low Fells.

Much of Cumbria's ancient woodland experiences an oceanic climate. This means high rainfall, high humidity, and low variation in temperature. It is some of England's only **Atlantic rainforest** (otherwise known as temperate rainforest). This is a globally rare habitat and one of the most biodiverse habitats in the UK, containing hundreds of different species of mosses, lichens and fungi.

▶ Traditional orchard

A traditional orchard is an area of **fruit and/or nut trees and shrubs** planted at low densities in permanent grassland and managed in a low intensity way to produce food. Traditional orchards are found throughout the county but are largely absent from the central Lake District and parts of the west coast. The main concentration is in the south of the county.

▶ Wood pasture and parkland

Wood pasture and parkland is an **open area of trees** (including ancient or veteran trees) that occurs within land that has been managed through grazing. They are mosaic habitats and are particularly important for invertebrates, lichens, mosses, and fungi, many of which depend on **dead or decaying wood**. Wood pasture is an under-recorded habitat, but its value is being increasingly recognised. Wood pasture is generally found within the Lake District and Yorkshire Dales National Parks. Parkland is generally associated with large **country houses and estates.**

Levens Park

Johnny Wood, Borrowdale

▶ Hedgerows

A hedgerow is a row of trees or shrubs that is planted as a boundary line around a parcel of land such as a field or garden. Hedgerows have intrinsic biodiversity value as they provide **movement and feeding corridors for wildlife**. They can be found throughout Cumbria, from the flat plains of the Solway Basin to the tracks and byways of the Cumbria Low Fells. They also occur on a wide range of rock and soil types, giving a great deal of regional variation in hedgerow composition and form. The percentage of ancient wildlife-rich hedgerows is not known and there are currently no designated sites for hedgerows in Cumbria, but some will include hedgerows as part of the field system.

▶ Wildlife-rich scrub and bracken

Scrub is dominated by **bushes or shrubs** and is a dynamic successional habitat that occurs on the edge of woodland and grassland. Scrub is important for biodiversity, particularly in supporting insects and breeding birds. Remnant areas of scrub can be found throughout Cumbria, particularly on upland fringes often in the form of **old hawthorn trees** with little young growth to replace them. However, areas where dynamic succession can occur are very rare.

Hedgerow near Beck Foot, Cumbria

Bracken covers many of our open areas of hillside due to its ability to rapidly outcompete other plants. It can be a useful indicator of areas where woodland once existed, and which would likely be suitable for the creation of new woodland or scrub.

▶ Other woodland and trees

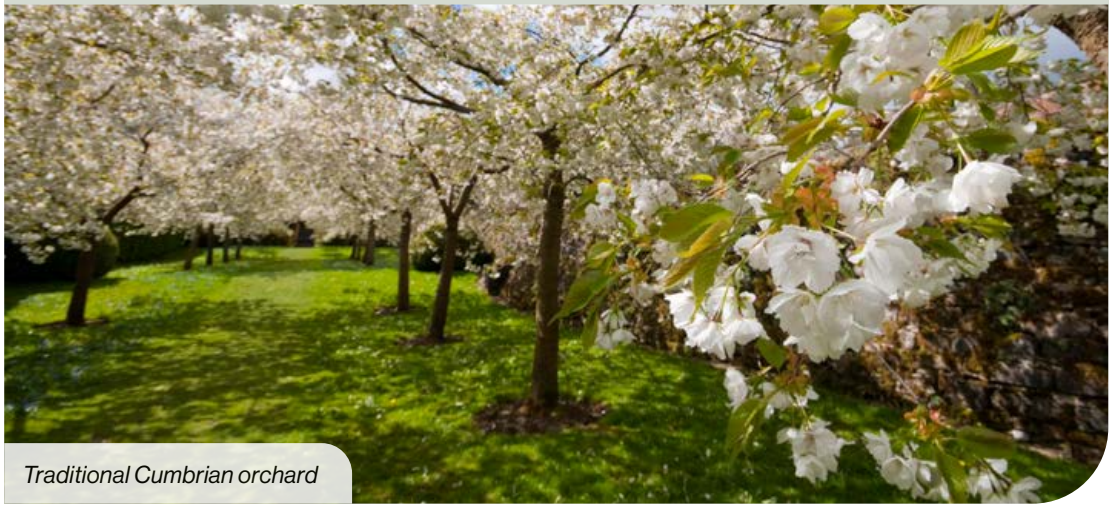
Of the county's woodland, approximately 19,000 ha is classed as **coniferous**. Just under half of this is part of the National Forest Estate and includes forests such as Whinlatter, Grizedale, and Ennerdale. These areas are used for timber production, recreation, and managed to support wildlife. Along with other forests such as Whinfell and Thirlmere, they are strongholds for red squirrel. Whilst generally less biodiverse than broadleaved woodland[29], **low impact silviculture** is diversifying tree species and forest structure to support a wider variety of wildlife. It is adding to that already found along rides and the other open habitats within the forest areas.

Trees outside of woodland, including **ancient and veteran trees**, are important features for habitat connectivity within our landscape. They support a variety of rare lichens as well as invertebrates and mammals such as bats.

29. Woodland Wildlife Toolkit (N.D.) *Mixed and confider woodlands.* Available at https://woodlandwildlifetoolkit.sylva.org.uk/advice-types-conifer

Where to see

- **Upland oakwood** – Duddon and Borrowdale valleys
- **Ashwood** – on the limestone hills around Morecambe Bay
- **Wet woodland** – along the rivers Irthing and Lune and fringing many of our lakes
- **Traditional orchard** – Lyth and Winster valleys (noted for damson orchards)
- **Wood pasture** – Gowbarrow Park along Ullswater, Rydal Park, Borrowdale, and Binnie Banks near Geltsdale
- **Parkland** – Lowther Castle, Levens Park, Holker Hall, Hutton-in-the-Forest, Armathwaite Hall, Corby Castle, Naworth Castle, and Muncaster Castle. Rickerby Park is a historic urban parkland next to the River Eden
- **Wildlife-rich hedgerow** – Strickley Farm, Old Hutton



Traditional Cumbrian orchard

Whinlatter Forest

Species

Woodland, trees, and scrub support a vast array of different species. These include flowering plants, ferns, mosses, lichens, and fungi. There's also a range of animals including insects, birds, and mammals such as our iconic red squirrel. Trees and hedgerows are also key to providing wildlife corridors that connect habitats through Cumbria's landscape.

The main species that our woodland, trees, and scrub habitat support have been grouped into the following assemblages:

Broadleaved woodland

Threatened species which typically inhabit our broadleaved woodlands include birds such as wood warbler, hawfinch, and tree pipit and mammals such as **red squirrel**, pine marten, and several species of bat. They also include butterflies and moths such as high brown fritillary, barred tooth-striped moth, and duke of burgundy.

Upland oakwood

This includes threatened species that thrive in our Atlantic rainforests, which are some of our best examples of ancient woodland. Species in this assemblage include redstart, pied flycatcher, and several mosses and lichens including **sparkling signal moss.**

Wet woodland

This includes threatened species that thrive in wet woodland habitats. They include coralroot orchid, **netted carpet moth**, willow tit, and **willow gloves fungus.**

Veteran and ancient trees

This assemblage covers a range of **lichen species** that are found on individual veteran and ancient trees.

LNRS priority species requiring bespoke action

- **Red squirrel** – native red squirrel populations have declined severely due to the impact of the introduced non-native grey squirrel. Coniferous woodland favours the red squirrel, providing stronghold areas across the county. In the long-term we want to see recovered, sustainable red squirrel populations across the whole county.
- **Sparkling signal moss** – this can be found in the Atlantic rainforests of Cumbria including Johnny Wood in Borrowdale, and Scales Wood near Buttermere. These unique habitats are some of our best examples of ancient woodland.
- ***Ricasolia amplissima*** – this is a large, foliose lichen that grows on older, more basic-barked trees, usually in open parkland/wood pasture habitats. It is indicative of good ecological continuity but has been badly affected by pollution over the last century.
- **Netted carpet moth** – this is a medium sized moth that inhabits wet woodland. Except for a few sites in Lancashire, Cumbria holds the entire UK population of this species. Their habitat needs damp, disturbed ground for the larval foodplant (touch-me-not balsam) to establish.
- **Hazel dormouse** – this small nocturnal rodent lives in woodlands and hedgerows. With the population reaching critically low levels in Cumbria, small populations have been reintroduced to south Cumbria in recent years. Whilst early indications are looking successful, more action is needed to achieve the recovery of this species.
- **Willow gloves fungus** – this rare fungus is a parasite on an uncommon host fungus, known as 'willow glue'. It lives inside the dead twigs and small branches of willow trees and is found in fragmented habitat (wet willow carr) that has suffered large historical losses. It was assessed as being potentially on the brink of extinction in the UK in 2003. Following a feasibility study into reintroducing the species to England in 2022, three sites in Cumbria were chosen for reintroduction of willow gloves fungus in 2024.

Netted carpet moth

Red squirrel

Ash dieback on limestone, Whitbarrow Scar

Pressures and threats

The key pressures and threats that affect the condition and extent of our woodland, tree, and scrub habitats include[30]:

- **climate change**
- **diseases, pests, and invasive non-native species**
- **development**
- **pollution**
- **fragmentation**
- **grazing pressure from domestic livestock and deer**

Increases in the frequency and severity of storm events due to climate change can have a damaging effect on our woodlands, through flood damage and windblow. Mature woodlands take a long time to establish, and woodlands establishing now may not be suitable for our **changing climate**. Our newly established woodlands and our ancient woodlands and trees can be particularly susceptible to drought conditions. Drought is predicted to become more frequent.

Many woodland species are not very mobile. This makes it harder for long established woodland species to adapt to climate change. Habitat and species under stress have also increased vulnerability to more mobile **pests and diseases** that are increasing or shifting their range as the climate warms. As a result, diseases such as Ash Dieback and other emerging diseases and invasive non-native species are becoming more widespread. Awareness of imminent and emerging risks is needed to plan for the future.

Balancing the needs of nature with the needs of people often puts woodland habitats at risk from **development**. This can impact on woodlands through their direct loss and fragmentation to make space for development. There are also indirect impacts through

30. Woodland Trust (2024). *Threats to Woods and Trees.* Available at www.woodlandtrust.org.uk/protecting-trees-and-woods/threats-to-woods-and-trees

increased **pollution, disturbance**, and the introduction of **non-native plants** from gardens and landscaping schemes.

Many ancient and native woodlands are small and have become increasingly isolated from other semi-natural habitats. This **fragmentation** means that if a species disappears from a woodland, there is no longer a nearby source from which it can recolonise. Hedgerows and field trees are common features across Cumbria, but many have been removed over the years as field sizes have increased to accommodate larger machinery and production yields. Fences have offered a cheaper, lower maintenance alternative, adding to the fragmentation of our wooded landscape.

Woodlands are complex habitats which vary hugely in size, age, structural diversity, and management requirements. **Grazing or browsing pressure** can limit the ability for seedlings to develop into young trees. This can reduce structural complexity, as well as reducing the diversity of the woodland understorey. In the long-term, this can ultimately cause the loss of woodlands. Grazing or browsing can be from domestic livestock or when levels of native deer become too high. Browsing from grey squirrel can also damage young woodlands that are not yet fully established.

Opportunities for recovery and wider benefits

Woodlands and trees already store large quantities of carbon and are a key tool for reducing our contribution to climate change. Planting more trees and creating more woodland will further increase the amount of carbon that is absorbed and stored in our woodlands. Their potential as a **carbon storage** solution is huge. When timber is used in construction, we can lock carbon into our buildings for decades. In towns and cities, trees can help people and species adapt to climate change by providing shade and helping to keep our built-up areas cool.

In rural settings, trees and hedgerows are traditional farming systems that make up Cumbria's cultural heritage. As well as field boundaries, hedgerows also provide shelter and shade for livestock, capture field runoff, store carbon, and provide wildlife corridors through our farmed landscape.

Creating more woodland, wood pasture, hedgerows and scrub and increasing the structural diversity of our existing woodlands can be an effective way of slowing the flow of water

Tree planting volunteers

New planting above Windermere

downstream after rainfall events. This reduces the severity of potential fluvial flooding through what is known as **natural flood management.** Riparian planting can also keep rivers cool by providing dappled shade and intercept pollution and sediment from adjacent land.

Healthy and plentiful woodlands and trees also **improve air quality**. They intercept sulphur dioxide, nitrogen dioxide, and ammonia from the air, and capture particulate pollution on their leaves. They also form a physical barrier between sensitive habitats, people, and sources of pollutants.

Woodlands are also an important resource for people. Woodland creation near built-up areas provides more places for people to engage with nature, **improving physical and mental health and wellbeing**. It also builds local assets such as community orchards which contribute to food and nutritional security within communities.

Changes in national environmental and agricultural policy provide multiple support mechanisms to restore and enhance our existing woodland habitats as well as the creation of new woodland. This includes hedgerows, which are relatively simple to re-establish or to modify their management to enhance their biodiversity value.

The government's Environmental Improvement Plan identifies two key national environmental objectives that relate to the protection, restoration, and creation of wildlife-rich woodland, trees, and scrub. These are to:

- **increase tree canopy and woodland cover to 16.5% of total land area by 2050, with an interim target to increase tree canopy and woodland cover by 0.26% of land area (equivalent to 34,000 ha) by 31 January 2028**
- **support farmers to create or restore 30,000 miles of hedgerows a year by 2037 and 45,000 miles of hedgerows a year by 2050**

The Environmental Improvement Plan also identifies the creation and management of trees and woodland as a key mechanism for achieving many of the other objectives in the plan. These include objectives on carbon and climate change, air quality, water quality and quantity, nature-based solutions, and sustainable resources.

Priorities and potential measures for nature recovery

Our vision for woodland, trees, and scrub is:

"A landscape rich in trees including well-managed and connected woodland, wood pasture, hedgerows, scrub, and individual trees."

The following priorities and potential measures have been identified to help us achieve our vision. Measures including a place marker are mapped and can be viewed on the Local Habitat Map.

Priority 8: **Sustainable forest management**

70% (50,000 ha) of existing woodland to be under sustainable management practices which maintain and enhance biodiversity by 2035.

W1

Manage woodland to be wildlife-rich by increasing structural and species diversity and resilience within the wooded landscape, using established techniques such as:

- low impact silviculture, such as continuous cover forestry
- promoting the use of climate change resilient native tree species (using natural regeneration, and planting stock from local or appropriate, more southerly provenance) matched to site characteristics and management objectives
- conserving standing deadwood and cavities, split trees and boughs, or where not present providing boxes to increase nesting and roosting opportunities for woodland birds and bats
- creating glades/rides and open areas in appropriate locations within woodland to benefit lichens and woodland butterflies
- maintaining shaded and humid conditions where rainforest bryophytes and ferns are present
- retaining standard trees (especially oak) where dormice are present
- undertaking appropriately timed rotational coppicing of hazel where dormice are present, to promote a dense shrub layer and structural complexity, whilst avoiding nesting and hibernation seasons
- retaining deadwood within woodland to create a range of microhabitats to benefit invertebrates and fungi
- controlling INNS such as rhododendron and grey squirrel
- controlling grazing pressure to enable successful tree and shrub establishment
- managing game-rearing and shooting sustainably, following recommendations made in the UK Woodland Assurance Standard

W2

Manage and restore traditional orchards to be in good condition.

W3

Develop site-specific woodland management plans in accordance with UK Forestry Standard, where all habitats are managed and monitored appropriately to maximise the benefits to biodiversity.

W4	Adopt precautionary tree health measures by undertaking relevant surveillance and subsequent management of diseases and pests to prevent their establishment or spread.

W/M5	Monitor and control deer as part of a Cumbria wide deer management strategy.

Bespoke LNRS priority species-specific measures

Red squirrel

S1	Work towards the removal of grey squirrels from Cumbria through: • coordinated legal control of grey squirrels • cross-border collaborative action with stakeholders in neighbouring counties • developing medium-term and long-term strategies to enable red squirrel recovery • increasing public awareness/education on reporting red and grey squirrel sightings, to improve presence/absence monitoring programmes

S2	Favour small-seeded tree species (such as blackthorn, bird cherry, pine species, hawthorn, and holly) in planting schemes that are in or adjacent to red squirrel strongholds.

Netted carpet moth

S3	Expand populations of netted carpet moth in Cumbria through: • appropriate ground disturbance through cattle grazing, raking, or trampling, to promote the growth of touch-me-not balsam (the food plant for netted carpet moth) • translocating touch-me-not balsam to suitably restored sites in consultation with specialists • focusing management and expansion around existing colonies

Hazel dormouse

S4	Carry out translocations to bolster and connect existing populations of dormouse and maintain genetic diversity, under specialist advice.

Willow gloves fungus

S5	Review the success of the reintroduction methods already trialled for willow gloves fungus and: • if successful repeat translocations at other sites in the same region to build a robust population • if unsuccessful conduct further reintroduction trials using alternative methods

Priority 9: **Create and connect woodland**

Increase woodland and non-woodland tree cover in Cumbria by 10,000 ha by 2035, targeting the expansion of and improvement of connectivity between the existing woodland network.

W6 Create more woodland and tree cover (if supported following application of open habitats policy, wader guidance, and the peatland decision support framework), targeting the following wildlife-rich woodland types:

- upland oakwood and 'Atlantic rainforests' (in gills, fellsides/moorland edges, and where bracken is dominant)
- wet woodland (targeting floodplains, riparian zones, and plateaus)
- lowland yew on limestone and upland ashwood
- future wood pasture and parkland and ancient/veteran trees
- traditional orchards
- mixed and broadleaved woodland in good condition

W7 Target wildlife-rich woodland creation to buffer, expand, and connect ancient woodland to the wider treescape (so that there are trees of a varied age-range to assure continuity of mature/ancient trees), using a combination of:

- natural colonisation
- planting using native tree species that are of local or appropriate, more southerly provenance

W8 Favour woodland establishment which maximises genetic diversity, by natural colonisation if possible. If carrying out planting, use climate change resilient native tree species that are of local or appropriate, more southerly provenance.

W9 Design new woodland to incorporate open space and maximise use of existing habitats within and adjacent to the woodland creation site.

W10 Design new woodlands and their associated infrastructure to facilitate low impact silviculture such as continuous cover forestry.

W11 Support and develop the network of plant and tree nurseries specific to Cumbria.

W3 Develop site-specific woodland management plans in accordance with UK Forestry Standard, where all habitats are managed and monitored appropriately to maximise the benefits to biodiversity.

Bespoke LNRS priority species-specific measures

Sparkling signal moss

S6

Safeguard sparkling signal moss populations in Cumbria by:

- carrying out targeted expansion of Atlantic rainforest habitat
- undertaking research to better understand the habitat management requirements of the species, including grazing regimes
- carrying out targeted monitoring on range, population size, occupied sites, and threats to these including climate change

Priority 10: **Ancient woodland and ancient and veteran trees**

75% (12,250 ha) of ancient woodland and ancient and veteran trees are under sustainable management, and are in or are moving towards good ecological condition by 2035.

W12

Manage existing wood pasture and parkland to ensure it is a fully functional habitat, with large open grown trees of a varied age-range to ensure succession, deadwood, shrubs, and rich ground flora by:

- maintaining an ecologically appropriate grazing regime that allows tree regeneration but prevents shading of trees to the detriment of epiphytes
- controlling deer
- retaining fallen and standing deadwood
- avoiding the use of fertilisers, pesticides, and herbicides

W13

Restore plantation on ancient woodland sites (PAWS) to wildlife-rich woodland using established techniques such as:

- continuous cover forestry
- low impact silviculture
- promoting the use of climate change resilient native tree species (using natural regeneration, and planting stock from local or appropriate, more southerly provenance) matched to site characteristics and management objectives
- controlling grazing pressure to enable successful tree and shrub establishment
- ensuring that any remnant ancient woodland features are protected and managed sensitively while progressing restoration to native woodland

W14

Safeguard veteran and ancient trees and their associated birds, bats, invertebrates, fungi, lichens, and mosses by:

- preventing the loss of ancient trees due to development or unregulated felling
- protecting root zones (that can spread far beyond the canopy) from compaction and damage
- maintaining pollarding, where this was established when the tree was young
- protecting trees from excessive cutting or pruning, especially when the tree has not been managed by pollarding
- protecting the species that live in and on ancient trees by reducing or avoiding the use of pesticides, slurry, fertiliser, and other pollutants
- maintaining a range of tree ages to ensure succession
- retaining both standing and fallen deadwood

W7

Target wildlife-rich woodland creation to buffer, expand, and connect ancient woodland to the wider treescape (so that there are trees of a varied age-range to assure continuity of mature/ancient trees), using a combination of:

- natural colonisation
- planting using native tree species that are of local or appropriate, more southerly provenance

W4

Adopt precautionary tree health measures by undertaking relevant surveillance and subsequent management of diseases and pests to prevent their establishment or spread.

W/M5

Monitor and control deer as part of a Cumbria wide deer management strategy.

Bespoke LNRS priority species-specific measures

***Ricasolia amplissima* (lichen usually found in open parkland/wood pasture)**

S7

Safeguard *Ricasolia amplissima* populations in Cumbria by:

- monitoring known sites to make sure host trees aren't cut down, dying, or falling down
- planning for succession of host trees with suitable bark conditions/ecology
- undertaking translocations to other suitable host trees, following specialist advice

Priority 11: **Hedgerows and scrub**

Restore or create 1,250 km of species-rich native hedgerows[31] and 5,000 ha of high nature conservation value scrub[32] by 2035 and increase the amount of the existing resource that is under favourable management.

W15

Manage existing hedgerows to be wildlife-rich by:

- maintaining them in a variety of heights, conditions, and widths (including tall and wide hedges, those that include standard trees, and those that can flower and fruit abundantly)
- maintaining buffer strips either side
- planting up gaps in hedges with a mix of climate change resilient native species that are of local or appropriate, more southerly provenance
- planting hazel, blackthorn, bramble, and honeysuckle to benefit dormice
- timing cutting to avoid disturbance to breeding birds, and if likely to be present, dormice
- carrying out appropriately timed traditional hedge laying

W16

Plant species-rich native hedgerows (including standard trees) to create a connected and diverse network, with an emphasis on:

- restoring historical field boundaries
- replacing fences with hedgerows
- maintaining enclosures and field patterns with historical value

W17

Manage scrub as a mosaic of successional habitats, to benefit reptiles, invertebrates, and scrub nesting birds. Provide blocks of scrub interspersed with sheltered, sunny areas for varied foraging and basking opportunities and hibernation features.

W18

Expand high nature conservation value scrub cover by creating the appropriate conditions for a mix of scrub types to establish (including blackthorn scrub, gorse scrub, hawthorn scrub, hazel scrub, juniper scrub, willow scrub, mixed scrub), using techniques such as:

- grazing management
- scarification
- assisted sowing/planting

31. UKHab Ltd (2023). *UK Habitat Classification Version 2.0.* Available at www.ukhab.org
32. Natural England (1999). *Lowland Grassland Management Handbook,* 2nd ed. Available at https://publications.naturalengland.org.uk/publication/35034

Priority 12: **Forestry and nature**

More productive forest and woodland is created and managed sustainably to support wildlife-rich habitats, contribute to nature recovery networks, and deliver wider benefits while providing timber for a range of goods.

W1

Manage woodland to be wildlife-rich by increasing structural and species diversity and resilience within the wooded landscape, using established techniques such as:

- low impact silviculture, such as continuous cover forestry
- promoting the use of climate change resilient native tree species (using natural regeneration, and planting stock from local or appropriate, more southerly provenance) matched to site characteristics and management objectives
- conserving standing deadwood and cavities, split trees and boughs, or where not present providing boxes to increase nesting and roosting opportunities for woodland birds and bats
- creating glades/rides and open areas in appropriate locations within woodland to benefit lichens and woodland butterflies
- maintaining shaded and humid conditions where rainforest bryophytes and ferns are present
- retaining standard trees (especially oak) where dormice are present
- undertaking appropriately timed rotational coppicing of hazel where dormice are present, to promote a dense shrub layer and structural complexity, whilst avoiding nesting and hibernation seasons
- retaining deadwood within woodland to create a range of microhabitats to benefit invertebrates and fungi
- controlling of INNS such as rhododendron and grey squirrel
- controlling grazing pressure to enable successful tree and shrub establishment
- managing game-rearing and shooting sustainably, following recommendations made in the UK Woodland Assurance Standard

W19

Create more multifunctional productive mixed woodland (if supported following application of open habitats policy, wader guidance, and the peatland decision support framework), that deliver a range of products that can be capitalised upon, including:

- timber
- biodiversity
- carbon
- recreation and access

W9

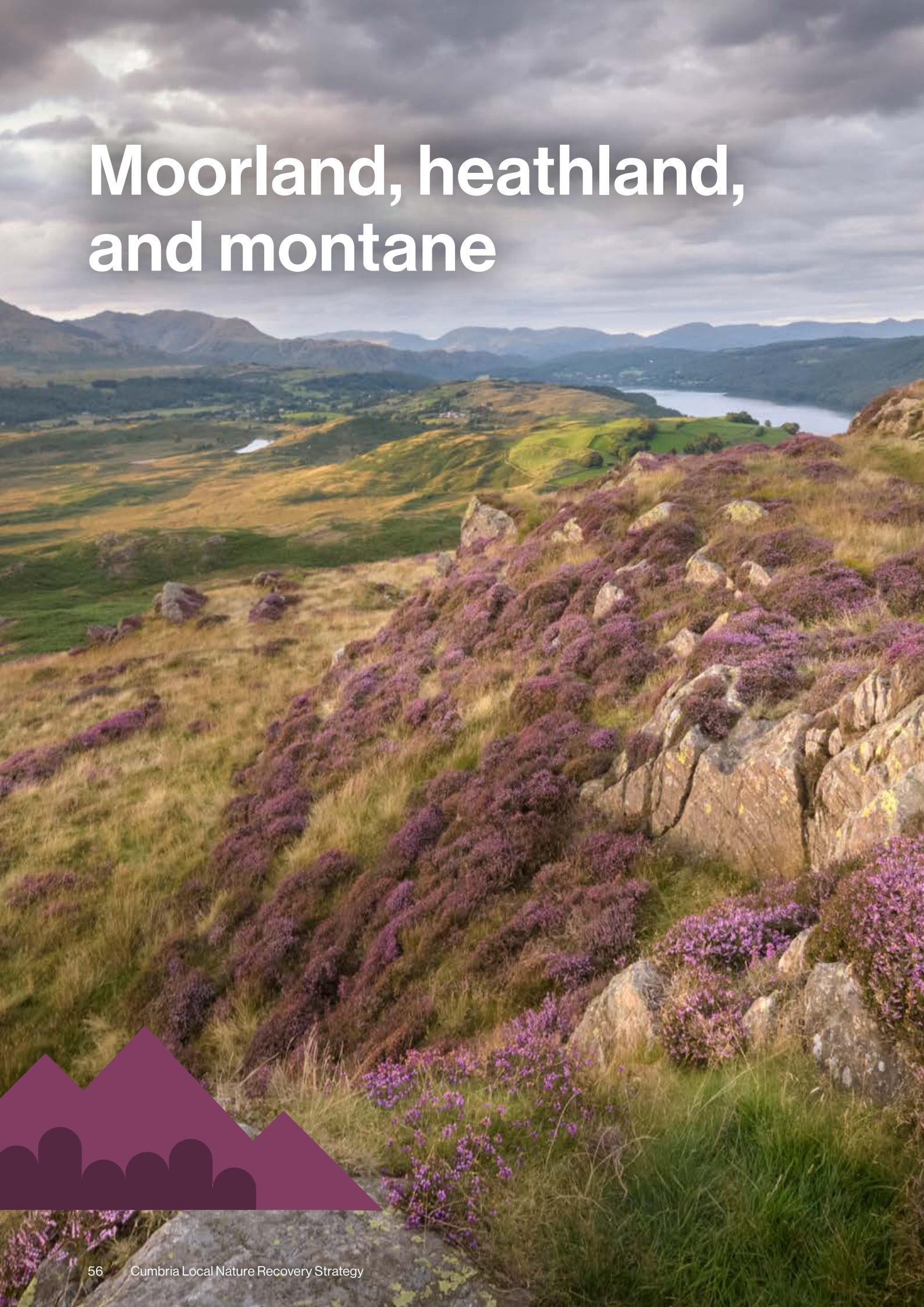
Design new woodland to incorporate open space and maximise use of existing habitats within and adjacent to the woodland creation site.

Opposite: The River Brathay with Skelwith Bridge and the Langdale Fells

W10	Design new woodland and their associated infrastructure to facilitate low impact silviculture such as continuous cover forestry.

O30	Explore innovative approaches to farming and forestry that minimise plastic use.

Moorland, heathland, and montane



Habitats

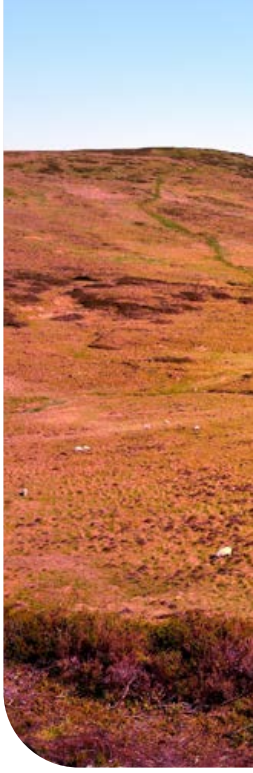
The habitat group of 'moorland, heathland, and montane' is made up of the following wildlife-rich habitats:

- **Blanket bog and valley mire**
- **Heathland**
  Upland heathland and lowland heathland
- **Montane habitats**
  Mountain heaths and willow scrub and inland rock outcrop and scree, montane heath and scrub, tall herb, cliffs and screes

This habitat group also considers valley mire and fragmented heath.

Our uplands are characterised by their **large unenclosed nature**. They form a complex mosaic of different habitats across the landscape. As well as blanket bog, valley mire, heathland, and montane habitats, our uplands can include flushes, tall herb habitats, upland grasslands, juniper, willow and other scrub, wood pasture and upland woodlands. This section discusses the habitats that are not covered under the 'wetland and freshwater', 'grassland and limestone pavement', and 'woodland, trees, and scrub' chapters. However, the full range of habitats should be considered as a **landscape scale mosaic** when planning action for nature recovery in our uplands.

Opposite: Moorland above Coniston Water
Below left: Black grouse, Below right: Sphagnum moss



There is over 60,000 ha of existing wildlife-rich moorland, heathland, and montane habitats across Cumbria. They are predominantly associated with the Cumbria High Fells, North Pennines, Howgill Fells, and Yorkshire Dales. However a much larger area of our uplands is not currently wildlife-rich and is considered to be restorable. The **national importance** of the Cumbrian uplands is recognised through the landscape scale designation of large areas or our uplands. Over 65% of our wildlife-rich moorland, heathland, and montane habitats are under some level of designation, mostly of national or international importance.

▶ Blanket bog and valley mire

Blanket bog is a **wet peatland habitat** formed of sphagnum mosses, cotton grasses, and dwarf shrubs such as heather and cross-leaved heath. It occurs on peat, which forms when waterlogged conditions prevent decomposition of sphagnum moss and other plants. Blanket bog is rain-fed and very nutrient-poor and typically occurs on peat more than 0.4 m deep on flat or gently sloping ground with poor drainage. It can cloak large areas of our upland landscape. In Cumbria, extensive areas of blanket bog are found in the Cumbrian High Fells, North Pennines, and within the Border Mires. These make up a significant proportion (just under 20%) of England's blanket bog, which is largely limited to the north-west of the country. It is an **irreplaceable habitat.**

Blanket bog, Moor House – Upper Teesdale NNR

Valley mire is similar to blanket bog but occurs in depressions in undulating ground and is fed by flowing water as well as rainfall. This means that it receives slightly greater amounts of minerals and can support a wider range of species.

▶ Heathland

Heathland is dominated by heather and other dwarf shrubs such as bilberry, cross-leaved heath, bell heather, crowberry, and cowberry. **Dry heath** occurs on acidic soils, which are more freely draining than blanket bog. **Wet heath** occurs on wet peat soils that are shallower than those that support blanket bog. **Upland heathland** covers large areas of the North Pennines, Cumbria High Fells, and Orton Fells. Upland heathland can occur on areas of deep peat which would have been blanket bog but have been modified by drainage and/or burning.

Heather on Armboth Fell

Lowland heathland is uncommon in Cumbria, but examples can be found on the sandstone hills in the Eden Valley, and on the limestone hills around Morecambe Bay. There are also some areas of lowland heathland along the coast. **Fragmented heath** occurs where other heathland habitats occur in a fragmented form, due to past burning and grazing practices, usually in a mosaic with grass moorland.

▶ Montane habitats

Montane heath is limited to the **higher summits** of the Lake District and North Pennine hill tops. **Rock ledges, outcrops, and screes** are found throughout the county. They are abundant within the Lake District and, to a lesser extent, the North Pennines. These montane habitats and the species they support vary depending on their underlying geology. Often high up in the hills and hard to reach, they are havens for some of our rarest wildlife.

These habitats support **Arctic alpine plant** species which are adapted to low temperatures and short growing seasons. Many of the Arctic alpine plant species found in Cumbria are at the southern limit of their distribution in the UK.

High Cup Nick, North Pennines

Where to see

- **Blanket bog** – Moor House – Upper Teesdale NNR, Butterburn-Flow, Geltsdale and the Lake District Fells including the Skiddaw fells, Haweswater, Shap fells, and Armboth Fell
- **Valley mire** – Thornhill Moss and Meadows NNR, Eycott Hill Nature Reserve
- **Upland heathland** – Geltsdale, Skiddaw, Buttermere Fells, Barbon Fell, and Kirkby Moor
- **Lowland heathland** – Wan and Lazonby Fells, Whitbarrow, Scout Scar and Helsington Barrows, Silloth and Walney Island
- **Montane heath** – Grasmoor, Skiddaw, and the Buttermere and Ennerdale fells; it is also found on the Cross Fell in the Pennines
- **Rock ledges and scree** – many of the central Lake District fells, such as Great Gable, Scafell, Scafell Pike, and Great End

Montane heath, Cross Fell, North Pennines

Species

Cumbria's moorland, heathland, and montane habitats support a distinctive assemblage of plants, insects, mammals, and breeding birds. The North Pennines in particular are important for species such as golden plover, curlew, dunlin, merlin, peregrine, hen harrier, and black grouse, which are qualifying features of the North Pennine Moors SPA.

The main species that our moorland, heathland, and montane habitats support have been grouped into the following assemblages.

Upland blanket bog

This assemblage includes threatened species that are associated with blanket bog. They include birds such as **dunlin** and **golden plover**, moth species such as red carpet and northern dart, common lizard, and several mosses and liverworts.

Moorland and upland grassland

These threatened species are associated with moorland and upland grassland. They include birds such as **hen harrier** and merlin, plants such as shepherd's cress, butterflies such as mountain ringlet, and a range of insects such as the bilberry bumble bee.

Upland habitat mosaic

This assemblage is made up of threatened species that need a mosaic of habitat structures including woodland, farmland, meadows, heath, grass moorland, scree, and scrub. Species in this assemblage include **black grouse**, juniper, large heath butterfly, bilberry bumble bee, and adder.

Arctic alpine and montane

This assemblage is made up of the threatened species that occupy the highest parts of our mountains. They include plants such as **pyramidal bugle**, dwarf birch, yellow marsh saxifrage, alpine catchfly, mountain ringlet butterfly, birds such as dotterel and ring ouzel, and several specialist mosses and lichens.

LNRS priority species requiring bespoke action

- **Upland breeding waders** (curlew, dunlin, golden plover, lapwing, oystercatcher, redshank, and snipe) – this is a group of wading birds that inhabit wet grassland, farmland, heath, and blanket bog. Sensitive to disturbance, their numbers have declined as a result of land intensification. The North Pennines is one of a few places in England that still supports large numbers of curlew.
- **Hen harrier** – this bird lives on our moorlands most of the year but can be seen in lowland and coastal areas in winter. One of the most intensely persecuted birds of prey in the UK, only a handful of breeding pairs remain in England.
- **Black grouse** – famous for the mating display behaviour shown by males, black grouse are found in the uplands of northern England and Scotland. Locally extinct in the Lake District, breeding pairs are still found in the North Pennines.
- **Arctic alpine plants** – this group of rare plants is limited to our highest mountain tops. Adapted to cool climates with short growing seasons and thin soils, these species are rarely found elsewhere in England. They are particularly vulnerable to climate change and grazing pressure.

Hen harrier

Alpine bartsia

Pressures and threats

The key pressures and threats that affect the condition and extent of our moorland, heathland, and montane habitats include:

- **management regimes**
- **grazing pressure**
- **climate change**
- **air pollution**
- **recreation**

Almost all of our heathland and blanket bog habitats have been degraded through historical **management regimes**. The results of these are still very visible today. They include the digging of drainage grips to lower the water table and increase the agricultural productivity of these habitats, burning to promote fresh heather growth for livestock or grouse, extraction of peat for fuel and compost, the planting of forestry for timber production, and the building of infrastructure for developments such as renewables, mining, or quarrying. **Heavy grazing** also has a significant impact on these habitats. It has led to the dominance of grass species and the conversion of heathland and blanket bog to upland acid grassland and rush pasture[33], limiting the distribution of montane species.

Climate change has the potential to have a significant impact on our heathland, blanket bog, and montane habitats. For example, drier, hotter summers risk further drying out of already degraded peat and increasing the dominance of grass species. Wetter winters with increased storm events will increase gullying and erosion of these sensitive habitats. When peatlands are in good condition, they act as an important carbon sink, absorbing and storing carbon from the atmosphere. However, when in poor condition peat releases carbon to the atmosphere, contributing to climate change. Many of our montane species are particularly at threat from climate change as they are at the southern and altitudinal limit of their range. As they are limited to isolated parts of our highest mountains it is difficult for them to respond to the changing climate.

Peat-forming sphagnum mosses are critical for healthy bog and wet heath. However, they require wet conditions and are therefore extremely susceptible to drying out from drainage and burning of peat. They are also very susceptible to trampling by livestock and deer.

33. The Wildlife Trusts (2024). *Blanket Bog.* Available at www.wildlifetrusts.org/habitats/wetlands/blanket-bog

Cottongrass, Thackmoor

Sphagnum mosses are sensitive to air pollution. Historically bogs have been significantly affected by acid rain as a result of sulphur-based **air pollution** from the industrial areas of the northwest, although this is a much larger issue in the South Pennines[34]. Airborne ammonia deposits can also affect our peatland habitats, which would naturally be very low nutrient environments.

Our upland habitats also support a range of recreational activities such as walking, mountain biking, rock climbing, and shooting. Whilst our upland habitats are a core part of Cumbria's tourism activity, these habitats are particularly sensitive to this **recreational pressure**. This can cause erosion, disturbance to sensitive habitats and species, and pollution through littering or human waste from wild camping.

Opportunities for recovery and wider benefits

Peatlands can **store large amounts of carbon** when in good condition. When waterlogged conditions prevent plants from decaying, the carbon in them is stored within the peat, slowly accumulating over thousands of years instead of being released to the atmosphere. Eroding and degraded peatlands can release large amounts of this previously stored carbon into the atmosphere. Restoring our degraded peatlands (both the deep peat in our blanket bog and the shallow peat under wet heath and wet species-poor acid grasslands), is a key tool for reducing our contribution to climate change.

Wet peatlands in good condition are also more resilient to the risks associated with climate change such as wildfires. As these risks increase, peatlands are considered a more reliable carbon store than woodlands because their carbon is stored below ground rather than above ground and is retained within the bog for much longer than the lifespan of most trees.

34. Moors for the Future Partnership (2015). *A practitioners Guide to Sphagnum Reintroduction.* Available at https://www.moorsforthefuture.org.uk/__data/assets/pdf_file/0020/92450/Practitioners-guide-to-the-reintroductin-of-sphagnum.pdf

Peat restoration volunteers at Saint Raven's Edge, Kirkstone

Heather covered hills above Derwentwater

Peatlands can hold large amounts of water, both in the soil and in plants such as sphagnum moss. Because of this they help regulate water flows by absorbing water during heavy rainfall and then releasing it slowly. By acting like a natural sponge, peatlands can reduce the severity of potential flooding through **natural flood management.**

Damaged peatlands release soil particles and nutrients into nearby rivers and reduce water quality. Where these habitats are in good condition, good vegetation cover reduces erosion and sedimentation of watercourses. Therefore, restoring peatlands **improves water quality** and reduces the cost of treatment for drinking water.

Our moorland, heathland, and montane habitats form the largest extent of our semi-natural habitat. These extensive areas represent the greatest opportunity to create fully functioning ecosystems that contain all the naturally occurring wildlife-rich habitat types. They support some of our rarest species, and form a distinctive part of Cumbria's landscape character, underpinning its **cultural heritage, agricultural, and tourism industries**. Enhancing and restoring these habitats and repairing and maintaining the footpaths that cross them, will help the species that inhabit them. It will also improve the relationship people who spend time in these upland habitats have with our landscape.

Changes in national environmental and agricultural policy provide multiple support mechanisms to restore and enhance our existing moorland, heathland, and montane habitats. Peatland restoration is well known as a means of mitigating against climate change. Restoration projects can also be registered with accredited carbon offsetting schemes.

The government's Environmental Improvement Plan has identified peatland restoration as a key mechanism for achieving our legally binding target of net zero carbon emissions by 2050. The plan aims to **restore approximately 280,000 hectares of peatland** in England by this time.

Priorities and potential measures for nature recovery

Our vision for moorland, heathland, and montane is:

"A connected and dynamic mosaic of the full range of upland habitats, which are under sustainable management with natural processes restored."

Moorland and montane habitats can include flushes, cliffs and screes, tall herb, grassland, juniper, willow and other scrub, wood pasture and upland woodlands as well as heath and blanket bog. Priorities and measures for each of these additional habitats are presented in the themes for 'wetland and freshwater', 'grassland and limestone pavement', and 'woodland, trees, and scrub' respectively. They should be implemented across the uplands in combination with those outlined below and in line with the principles presented under 'Priority 1 – Habitat mosaics'.

The following priorities and potential measures specific to upland bog, heathland and montane habitats have been identified to help us achieve our vision. Measures including a place marker are mapped and can be viewed on the Local Habitat Map.

Priority 13: **Restore upland bog habitats**

Restore 10,000 ha of blanket bog and valley mire and maintain under restorative and sensitive management (resulting in good hydrological and biological condition) as part of a dynamic mosaic of upland habitats by 2035.

M1

Restore hydrological function and appropriate robust vegetation cover, and species diversity on drained or actively eroding peatlands using established techniques such as:

- blocking grips
- installing bunding
- installing dams
- using coir matting to revegetate bare peat
- reprofiling hags
- sphagnum inoculation
- patch turfing
- spreading mulch/brash
- seeding and plug planting
- removing trees, scrub, and woodland, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework

M2

Manage peatland habitats to be wildlife-rich (enhancing species and structural diversity, ensuring robust vegetation cover, slowing water flow and protecting peat) by:

- maintaining ecologically appropriate grazing regimes and stocking levels
- carrying out ecologically appropriate heather management that is not harmful to important habitats, soils, and hydrological function
- reducing inputs of medication, pesticides, and biocides into the environment

M3

Manage habitats other than peatlands to be wildlife-rich, with a variety of dense and more open vegetation cover that protects and restores the hydrological function, nutrient status, and species diversity by:

- restoring natural hydrology
- maintaining low nutrient input
- maintaining ecologically appropriate grazing regimes and stocking levels
- establishing native scrub, woodland, and wood pasture in suitable locations such as areas of bracken, species-poor grassland over mineral soil, or as appropriate mosaics within heathland (if supported following application of open habitats policy, wader guidance, and the peatland decision support framework)
- managing wet grassland and rush pasture for breeding waders (generally with cattle grazing and by controlling soft rush) where they are known to breed
- ensuring sufficient open-habitat remains in and around known important nesting areas for breeding waders
- creating scrapes to ensure wet areas where waders are present, for them to feed during spring and summer

M4

Manage risks associated with wildfire using ecologically appropriate methods that are not harmful to important habitats, soils, and hydrological function.

W/M5

Monitor and control deer as part of a Cumbria wide deer management strategy.

M6

Avoid the construction of new stone vehicle tracks in moorland landscapes wherever possible and particularly in areas currently free from surfaced tracks, with no further stone track building on deep peat.

O13

Protect sensitive habitats against the impacts of recreational pressure by:

- utilising partnership working to ensure consistent messaging
- funding wardens and engagement officers
- providing access management including fencing, groundworks, and considering the use of public space protection orders
- providing training
- delivering footpath improvements
- promoting responsible recreational behaviour
- considering the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites
- providing education on dangers of wildfire

O27 Improve air quality and tackle ammonia losses by interventions such as:

- planting shelterbelts next to livestock housing
- covering farmyard muck heaps
- managing slurry sustainably

Priority 14: **Enhance and restore heathland habitats**

Re-create 10,000 ha of heathland and have 90% of the existing resource under appropriate management as part of a dynamic mosaic of upland habitats by 2035.

M2 Manage peatland habitats to be wildlife-rich (enhancing species and structural diversity, ensuring robust vegetation cover, slowing water flow and protecting peat) by:

- maintaining ecologically appropriate grazing regimes and stocking levels
- carrying out ecologically appropriate heather management that is not harmful to important habitats, soils, and hydrological function
- reducing inputs of medication and pesticides into the environment

M3 Manage habitats other than peatlands to be wildlife-rich, with a variety of dense and more open vegetation cover that protects and restores hydrological function, nutrient status, and species diversity by:

- restoring natural hydrology
- maintaining low nutrient input
- ecologically appropriate grazing regimes and stocking levels
- establishing native scrub, woodland, and wood pasture in suitable locations such as areas of bracken, species-poor grassland over mineral soil, or as appropriate mosaics within heathland (if supported following application of open habitats policy, wader guidance, and the peatland decision support framework)
- managing wet grassland and rush pasture for breeding waders (generally with cattle grazing and by controlling soft rush) where they are known to breed
- ensuring sufficient open-habitat remains in and around known important nesting areas for breeding waders
- creating scrapes to ensure wet areas where waders are present, for them to feed during spring and summer

M7

Restore dwarf-shrub cover to areas which previously supported heathland vegetation, to make them wildlife-rich by:

- removing trees, scrub, and woodland, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework
- restoring grass moorland to heathland through grazing management
- reintroducing missing plant species through scarification and seeding

M8

Manage lowland heathland to be wildlife-rich by:

- removing trees, scrub, and woodland, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework
- maintaining ecologically appropriate grazing regimes and stocking levels
- maintaining patches of bare ground to provide invertebrates and reptiles with foraging, refuge, and basking opportunities

M4

Manage risks associated with wildfire using ecologically appropriate methods that are not harmful to important habitats, soils, and hydrological function.

W/M5

Monitor and control deer as part of a Cumbria wide deer management strategy.

O13

Protect sensitive habitats against the impacts of recreational pressure by:

- utilising partnership working to ensure consistent messaging
- funding wardens and engagement officers
- providing access management including fencing, groundworks, and considering the use of public space protection orders
- providing training
- delivering footpath improvements
- promoting responsible recreational behaviour
- considering the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites
- providing education on dangers of wildfire

G3

Sensitively re-work gravels/mine spoil to prevent encroachment of successional vegetation, growth, and shading on calaminarian grasslands and mine spoils.

Bespoke LNRS priority species-specific measures

Upland breeding waders (curlew, dunlin, golden plover, lapwing, oystercatcher, redshank, and snipe)

S8

Safeguard breeding wader populations by:

- ensuring sufficient open-habitat remains in and around important nesting areas (if supported following application of open habitats policy, wader guidance, and the peatland decision support framework)
- protecting nests using electric fencing (where required) to prevent disturbance or destruction
- ensuring that nests are not disturbed or destroyed by moorland management, in-field operations, trampled by livestock, or disturbed by dogs and people
- undertaking proportionate and legal short-term control of predators where productivity is proven to be a limiting factor for population status
- liaising with farmers and land managers to increase awareness of these species and their needs

Black grouse

S9

Restore black grouse populations by:

- undertaking proportionate and legal short-term control of predators where productivity is proven to be a limiting factor for population status
- where present, assessing the impact of new fencing and remove or marking existing fencing
- carrying out potential translocations or localised reintroductions where appropriate, using wild-sourced birds, under specialist advice
- avoiding disturbance to sites where breeding displays (leks) take place

Hen harrier

S10

Restore hen harrier populations by:

- collaborating with landowners and conservation organisations to reduce the drivers of illegal persecution of hen harriers
- continuing surveys and population monitoring of nesting and winter roost sites
- protecting nests by managing vegetation to ensure sufficient cover for nesting, avoiding recreational disturbance, and avoiding cutting and burning within 100 m of nest sites used in the last 5 years
- protecting winter roosts by avoiding cutting, mowing/topping, tree planting, wind farm development, and recreational disturbance
- managing foraging habitat sympathetically within a 1 km radius of nesting sites, to support the availability of key prey resources during breeding season
- undertaking proportionate and legal short-term control of predators where productivity is proven to be a limiting factor for population status

Priority 15: **Montane habitats**

Restore, enhance and create 500 ha of montane habitats as part of a dynamic mosaic of upland habitats that are under appropriate management by 2035.

M9 Manage montane habitats to be wildlife-rich through ecologically appropriate grazing regimes and stocking levels, to enable remnants of grazing-sensitive montane habitats such as tall herb vegetation, rare Arctic alpine plants, mountain top moss-heaths, and grasslands to expand.

M10 Protect montane habitats from sources of damage by:

- continuing to work with the climbing community to ensure they understand how to avoid damage and disturbance to sensitive habitats and species, observe seasonal climbing restrictions and avoid 'gardening' new routes
- ensuring that footpath repairs are designed to avoid damaging, and where possible aid the enhancement of sensitive upland habitats
- managing grazing pressure and recreational access to prevent soil erosion and allow sensitive plants to grow and set seed

M11 Restore habitats that have become extremely fragmented in the English uplands such as:

- high-altitude scrub communities that contain species such as juniper, mountain willows, and dwarf birch
- flower-rich tall herb communities

O27 Improve air quality and tackle ammonia losses by interventions such as:

- planting shelterbelts next to livestock housing
- covering farmyard muck heaps
- managing slurry sustainably

W/M5 Monitor and control deer as part of a Cumbria wide deer management strategy.

Bespoke LNRS priority species-specific measures

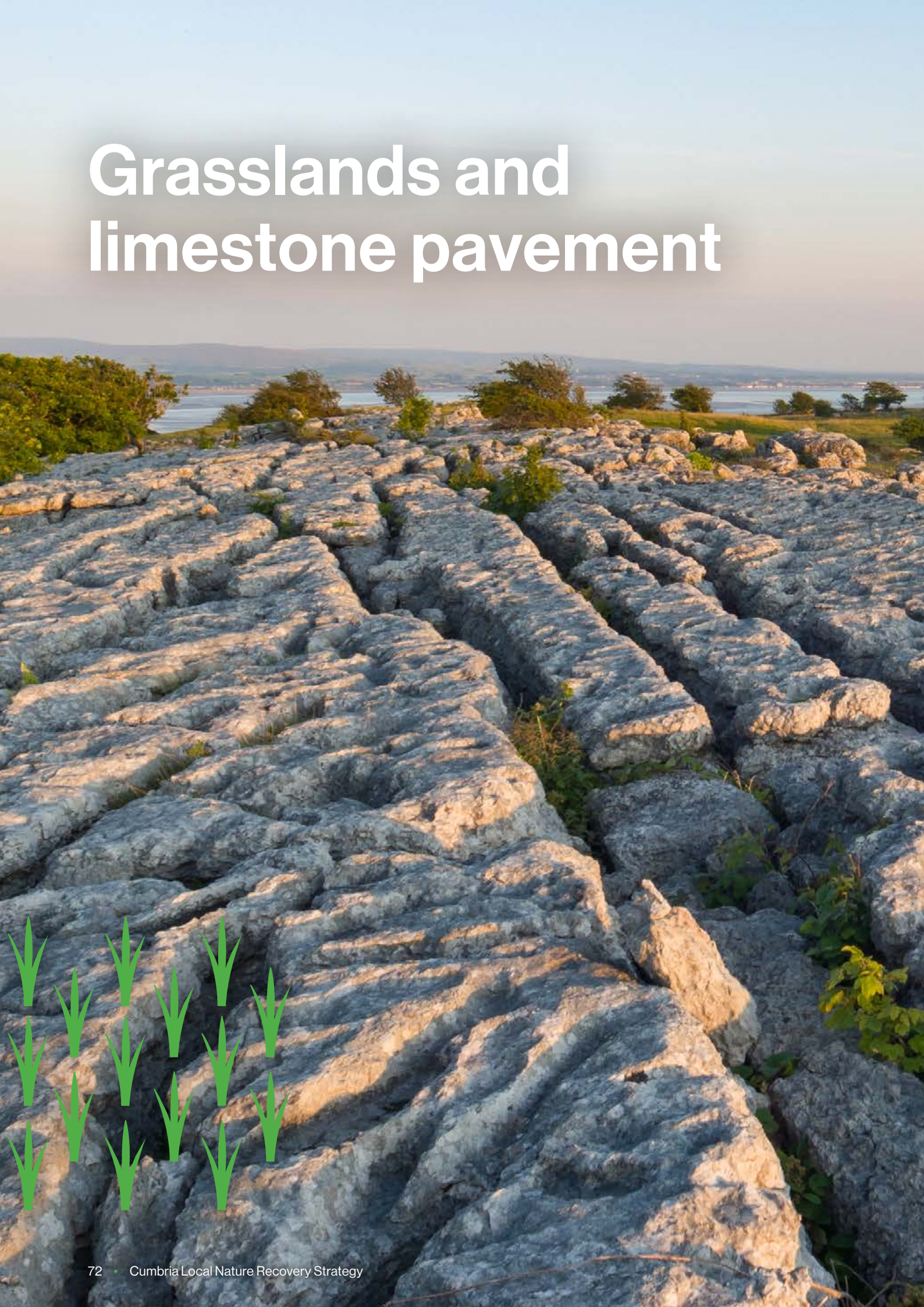
Arctic alpine plants

S11	Carry out life cycle analysis (survey and research on distribution, population status, and limiting factors on restoration) on Arctic alpine plants, to understand the needs of each species, and the conservation action required.

S12	Develop a propagation programme in nurseries to support the translocation of rare and locally extinct Arctic alpine plant species that have been lost or have declined, using: • local/appropriate provenance seed (propagules) • specialist direction/advice

Peat restoration at Saint Raven's Edge, Kirkstone

Grasslands and limestone pavement



Habitats

The habitat group of 'grasslands and limestone pavement' is made up of the following wildlife-rich habitats:

- **Meadow**
  Lowland meadows, upland hay meadows and wildlife-rich neutral grassland
- **Calcareous grassland**
  Lowland calcareous grassland, upland calcareous grassland
- **Acid grassland**
  Lowland dry acid grassland, wildlife-rich lowland acid grassland, wildlife-rich upland acid grassland
- **Coastal and floodplain grazing marsh**
- **Calaminarian grassland**
- **Limestone pavement**

This habitat group also considers other grassland types such as grass moorland, other neutral grassland, and improved grassland. Limestone pavement is considered in this section as their management and protection generally relates to their surrounding habitats which are typically grassland or woodland.

Opposite: Limestone pavement on Hampsfell, Grange-over-Sands, Below left: Meadow in flower, Below right: Agricultural field in Smardale near Kirkby Stephen

Grassland covers most of our landscape in Cumbria. It can be found at all altitudes, from the Cumbria High Fells and North Pennines to the lowlands in the Eden Valley and Solway Basin. Our **wildlife-rich grasslands** range from species-rich meadows to the nationally scarce calaminarian grasslands located in the North Pennines, however most of Cumbria's grassland is **farmland or rough upland grazing.** Approximately 12,000 ha of Cumbria's grassland is considered to be wildlife-rich.

▶ Meadow

A meadow is a wildlife-rich grassland that needs traditional cutting and/or grazing to maintain its species diversity and prevent scrub colonisation. **Upland hay meadows (**also called Northern hay meadows) are extremely rare in the UK (<1,000 ha)[35] and are mainly found in the Yorkshire Dales, Lancashire, and the North Pennines. In Cumbria, upland hay meadows are generally restricted to upland valleys above 200 m. Most examples can be found in the Orton Fells, Howgill Fells, Yorkshire Dales, Lake District, and North Pennines.

Lowland meadows include both dry and seasonally flooded grassland and are most commonly found in the Eden Valley, West Cumbria Coastal Plain, and the Cumbria Low Fells. Wildlife-rich grasslands are also found on some roadside verges, churchyards, and other public land where appropriate management regimes maintain their wildlife-richness.

▶ Calcareous grassland

Calcareous grassland is wildlife-rich grassland that typically grows on **shallow, lime-rich soils over limestone bedrock** with a pH that is generally higher than 7. Calcareous grassland occurs mainly on the carboniferous limestone around Morecambe Bay, the Orton Fells, and on the western flanks of the North Pennines. Smaller fragmented outcrops occur around the northern Lake District, and on base-rich outcrops associated with the Borrowdale Volcanic rocks in the central Lake District. The most extensive calcareous grassland in Cumbria, a type dominated by blue moor grass, is rare in the UK and is only found on the carboniferous limestone of the Morecambe Bay area, the Craven district of North Yorkshire, and the borders of Cumbria, Durham, and North Yorkshire.

35. www.cumbriawildlifetrust.org.uk/habitats/grassland/northern-hay-meadow

Upland meadow at Gowk Bank

© Natural England/J Johnson

Floodplain meadow at Swindale

▶ Acid grassland

Lowland dry acid grassland is an uncommon habitat that occurs in areas that may once have been **lowland heathland** and have a pH generally from 4 to 5.5. This wildlife-rich grassland is generally only found as small areas on thin free-draining acidic soils overlying rocks, sand, or gravels in the lowlands. It is generally found: on the rocky outcrops in the South Cumbria Low Fells; on wind-blown sands on limestones around Morecambe Bay; on sand deposits and sandstones around Penrith, Carlisle, Brampton, and Aspatria within the Eden Valley and Solway Basin; and on coastal sand-dunes along the West Cumbria Coastal Plain.

▶ Coastal and floodplain grazing marsh

Coastal and floodplain grazing marsh is found on **low-lying coasts and along slow-flowing rivers and estuaries**. The best examples of coastal and floodplain grazing marsh are incredibly wildlife-rich. However most have been agriculturally 'improved' and the biodiversity quality varies greatly with much of it being less biodiverse. Coastal and floodplain grazing marsh is defined by proximity to water, topography, and management rather than the underlying soil or the vegetation. Most grazing marsh has generally been embanked, drained, and agriculturally improved, and is used for pasturing cattle with some cutting for hay or silage. Most coastal and floodplain grazing marsh in Cumbria is found around the Solway Basin and Morecambe Bay and is particularly important for the breeding, overwintering, and migrating birds that it supports.

▶ Calaminarian grassland

Calaminarian grassland supports a unique but limited range of **specialist plant species on heavy metal-rich soils**. These soils are associated with waste from former metal mining activity, and on metal-enriched river shingle originating from former mining in the catchment. In Cumbria, this habitat is almost exclusively confined to the former lead mines in the North Pennines around Alston, Nenthead, and the surrounding fells. This is a rare habitat in the UK and in England. It is only otherwise found in the Mendips, Derbyshire Dales, and Yorkshire Dales. Management of calaminarian grasslands needs careful consideration. This is due to the limited number of species that can survive on these soils, and the decline of heavy metal levels in surface soils over time due to vegetation succession. Management also needs to be sensitive to sites that have **local historical significance**.

▶ Limestone pavement

Limestone pavement comprises exposed, generally (but not always) **flat slabs of limestone rock** featuring shallow erosion pans ('clints') and scored with deep fissures ('grykes'). The rock surface supports little if any vegetation, but differences in the shape of pavements provides a lot of variety in environmental conditions. This results in rich, **complex vegetation communities**, especially in the moist, sheltered conditions in the grykes. A distinctive assemblage of plants associated with pavements includes colourful flowers like bloody cranesbill, globeflower, lily of the valley, and melancholy thistle. It also includes many lush ferns and rare species such as Soloman's seal, dark red helleborine, and baneberry.

The proportion of tree and scrub cover on limestone pavements is dependent on their management, particularly the level of grazing. Where limestone pavement is ungrazed, it can develop into an open form of **upland mixed ashwood**, which can also be extremely species-rich, or limestone scrub characterised by juniper and hawthorn. Pavements are also associated with limestone grassland in both upland and lowlands.

Cumbria has more than 30% of the limestone pavement habitat in the UK. It is an **irreplaceable habitat** and most of the pavements in Cumbria are designated as being of national importance. In Cumbria, limestone pavement is most extensive around Morecambe Bay and the Orton Fells between Shap and Kirkby Stephen. Smaller areas are found on the high western edge of the North Pennines and there are a few isolated areas on the northern edge of the Lake District.

Ferns growing in a gryke in a limestone pavement

▶ Other Grassland including grass moorland and improved grassland

The majority of Cumbria's grassland is managed for agricultural purposes. A large proportion of Cumbria's upland grassland is classified as **grass moorland**. This typically comprises upland acid grassland that is managed for sheep grazing. **Improved grassland** generally exists in the lowland areas of the county where fertilisers are applied to improve their productivity either for grazing, sileage, or hay crop production. **Arable** and dairy farming systems are mainly found around the Eden valley and the Solway coastal plain. Whilst these habitats are valuable for their agricultural function, they provide less value to nature than other wildlife-rich grasslands. However, there is potential to take action for nature recovery alongside food production.

Where to see

- **Upland hay meadow** – Gowk Bank NNR, Augill Pasture nature reserve, and High Borrowdale
- **Lowland meadow** – Sandybeck Meadow and High Leys NNR
- **Calcareous grassland** – Arnside Knott, Scout Scar near Kendal, Little Asby Common, and Smardale Gill near Kirkby Stephen
- **Calaminarian grassland** – Whitesike Mine and Flinty Fell SSSI and SAC between Garrigill and Nenthead, at the one remaining tailings dam at Nenthead, and at Moor House – Upper Teesdale NNR including along the shingle banks of rivers in this area
- **Limestone pavement** – Hutton Roof Crags nature reserve, Great Asby Scar NNR, Birkrigg Common, Whitbarrow Scar, and Hampsfell near Grange-Over-Sands

Calcareous grassland on Arnside Knott

Species

Grasslands and limestone pavement support a range of different plant and animal species. This includes an array of pollinating insects, some of our rarest butterflies and, at high altitudes, populations of rare Arctic alpine plants. The main species that our wildlife-rich grasslands and limestone habitats support have been grouped into the following assemblages.

Farmland

This includes a range of threatened birds that predominantly live in and around our farmed landscapes, including skylark, yellowhammer, kestrel, snipe, **curlew**, and barn owl. It also includes mammals and insects such as harvest mouse, bats, and the brown-banded carder bee.

Hay meadow

This includes threatened plant species that are associated with hay meadows, such as lady's mantle, meadow saffron, and small white orchid. It also includes bird and insect species such as curlew and the moss carder-bee.

Limestone grassland and pavement

This includes a wide range of species that are associated with limestone habitats. Species include plants such as Teesdale violet, birds'-eye primrose, and autumn Lady's tresses. Butterflies include the high brown fritillary, northern brown argus and duke of burgundy. It also includes the barred tooth-striped moth, white spotted sable moth, and the wall mason bee.

Wet/marshy grassland

The threatened species associated with wet/marshy grassland include a range of birds, particularly waders, as well as marsh fritillary butterfly and grass of Parnassus – the county flower of Cumbria.

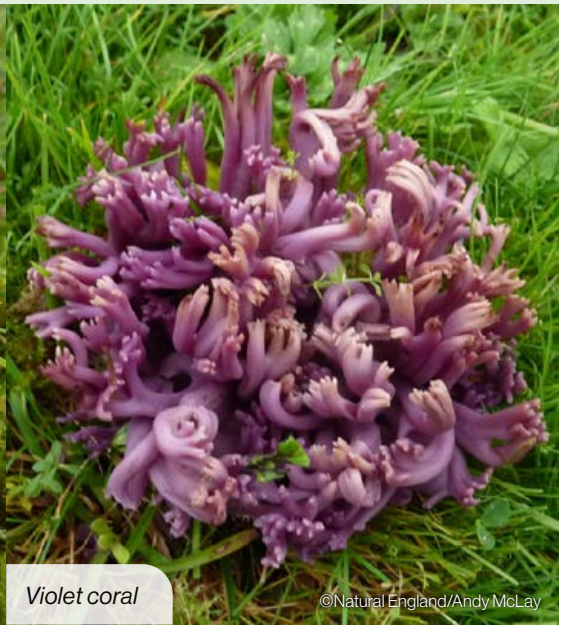
Mining spoil

This includes a small number of lichens, mosses, and liverworts that grow on old mining spoil heaps.

LNRS priority species requiring bespoke action

- **Waxcap fungi** – these are types of mushrooms known for their shiny-looking caps. They are often found in areas of long-undisturbed 'unimproved' grassland with short, grazed, or cut vegetation. Churchyards form a significant habitat area for waxcap grasslands in Cumbria.

Jubilee waxcap ©Natural England/Andy McLay



Violet coral ©Natural England/Andy McLay

Pressures and threats

The key pressures and threats that affect the condition and extent of our wildlife-rich grassland and limestone pavement include[36]:

- **agricultural improvement**
- **grazing pressure**
- **undermanagement**
- **development**
- **tree planting**

Agricultural improvements to increase productivity by applying herbicides and fertilisers and installing drainage can very quickly degrade wildlife-rich grasslands so that agricultural species outcompete wildflowers, which dislike soils with high nutrient content. During the mid-20th century, over 90% of wildlife-rich grasslands were lost[37]. This is mainly due to chemical fertilisers, reseeding with new increased-yield grass varieties, and government incentives. Ploughing for silage or arable crops can also alter the soil structure so it is less able to support diverse plant communities. Inappropriate cutting regimes can remove species before they set seed. If cuttings are not removed then nutrients can return to the soil, increasing the growth of competitive species and negatively impacting some native wildflowers.

Heavy grazing by livestock and deer, or grazing at the wrong time of year, is also detrimental to wildlife-rich grasslands as it prevents plants from flowering and setting seed. However, grasslands do require some management such as conservation grazing to create vegetation at different heights and some bare ground. Without management, competitive species can take over.

Wildlife-rich grasslands are often located in areas that are considered suitable for **woodland creation or development** (including housing and facilities such as play areas and golf courses). This puts them at risk of loss through changes to land use as well as agricultural pressures.

Calaminarian grasslands have different pressures to other wildlife-rich grassland types due to their association with **heavy metal-rich soils**. The main pressures on this grassland type are a decline in the toxicity of the surface soil leading to **successional change**, mine spoil reclamation or re-working, and a cessation of or decline in grazing.

36. NatureScot (2020). *Species Rich Grasslands Guidance Leaflet.* Available at www.nature.scot/doc/species-rich-grasslands-guidance-leaflet
37. The Wildlife Trusts (2024). *Natural Solutions to the Climate Crisis: Glorious Grasslands.* Available at www.wildlifetrusts.org/natural-solutions-climate-change/grassland-solutions

Calaminarian grassland in the Pennines

The main pressures on limestone pavements come from **grazing**. The appropriate management of limestone pavements depends on the wider associated habitats within which the limestone pavement sits. Grazing pressure and other land management therefore needs to be assessed on a site-specific basis as some limestone habitats can tolerate more grazing pressure than others. Historically, the main pressure on limestone pavement came from removal of the clints and their sale for rockery stone. There remains a residual risk of the loss of limestone pavement to provide stone for agricultural improvement or development, however Limestone Pavement Orders (LPOs) considerably reduce these risks.

Opportunities for recovery and wider benefits

Wildlife-rich grasslands are a key tool for reducing our contribution to climate change. When managed properly, they can **store large amounts of carbon**. Restoring more grassland to be wildlife-rich can increase the amount of carbon that is absorbed into our soil instead of being released to the atmosphere. As risks associated with climate change increase (such as wildfires, and pests and disease introductions), grasslands are considered a more reliable carbon store than woodlands. This is because approximately 90% of their carbon is stored below ground[38].

Wildlife-rich grasslands can also **improve soil health** due to the relationship between the plants on the surface and the fungi and bacteria within the soil. When located on the floodplain, wildlife-rich grasslands such as floodplain meadows can **improve water quality** by removing significant quantities of phosphorous, protecting soil from erosion (preventing soil and nutrients from running into nearby rivers), and intercepting runoff. Wildlife-rich grasslands also require less fertiliser than improved grassland. This is known as 'low-input farming' and can **reduce the costs to farm businesses.**

Wildlife-rich grasslands and their associated management can reduce soil compaction and create more structural diversity. This is an excellent way of slowing the flow of water downstream after rainfall events, helping to reduce the severity of potential flooding through **natural flood management.**

Changes in national environmental and agricultural policy provide multiple support mechanisms to restore or create more species-rich grassland. However, care must be taken to ensure that any new wildlife-rich grassland is located where nutrient input is limited and appropriate management can be conducted.

The government's Environmental Improvement Plan has a national environmental objective to bring at least **40% of England's agricultural soil into sustainable management by 2028**, increasing to 60% by 2030. Farming schemes that promote the management of grasslands to be wildlife-rich will be a key mechanism in meeting these targets.

38. PlantLife (2023). *Grasslands as a Carbon Store.* Available at https://www.plantlife.org.uk/wp-content/uploads/2023/08/Grasslands-as-a-Carbon-Store.pdf

Priorities and potential measures for nature recovery

Our vision for grassland and limestone pavements is:

"A network of native, wildlife-rich grasslands in good condition with healthy soils, within a mosaic of associated habitats."

The following priorities and potential measures have been identified to help us achieve our vision. Measures including a place marker are mapped and can be viewed on the Local Habitat Map.

Priority 16: **Conserve and enhance existing wildlife-rich grasslands**

Maintain and enhance the existing extent of wildlife-rich grassland, with 75% (8,500 ha) under appropriate management and in good condition by 2035.

G1

Manage existing wildlife-rich grassland to provide a mosaic of structural and species diversity (taking account of geology, hydrology, and sensitive species) by:

- cutting meadows for hay rather than haylage/sileage
- timing cutting to benefit plant species biodiversity
- utilising variable cutting regimes
- maintaining ecologically appropriate grazing regimes and stocking levels
- leaving rough margins where appropriate
- maintaining low nutrient input
- reducing inputs of medication, pesticides, and biocides into the environment

G2

Enhance/restore existing grassland to be wildlife-rich by:

- maintaining an ecologically appropriate grazing and/or cutting regime
- adding local provenance green hay
- adding local provenance brush harvested seed and wildflower plugs
- leaving rough margins where appropriate
- removing trees, scrub, and woodland, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework
- removing nutrient inputs

G3

Sensitively re-work gravels/mine spoil to prevent encroachment of successional vegetation, growth, and shading on calaminarian grasslands and mine spoils.

G4

Work with national infrastructure operators, local authorities, and landowners to manage verges, transport corridors, and public rights of way to be wildlife-rich, and maintain existing wildlife-rich habitats by:

- timing cutting to benefit plant species biodiversity
- removing arisings
- reintroducing missing plant species through scarification and seeding

G5

Increase species diversity and reduce nutrient levels in and around wildlife-rich grasslands by:

- reducing the use of pesticides and herbicides
- reducing the use of artificial inorganic and organic fertilisers

G6

Support grassland restoration by:

- creating a county wide hay market and register
- sharing cut and collect equipment
- exchanging seeds and sharing storage to enable sourcing and propagation of more locally appropriate seed to be used in restoration and enhancement
- establishing flying flocks and herds

G7

Develop a propagation programme in nurseries to support the translocation of rare and locally extinct grassland plant species that have been lost or have declined, using:

- local/appropriate provenance seed (propagules)
- specialist direction/advice

Bespoke LNRS priority species-specific measures

Waxcap fungi

S13

Safeguard waxcap fungi in Cumbria by:

- identifying, recording, and better protecting our waxcap fungi grasslands
- conducting more thorough surveys for fungi before committing to land use change where important waxcap assemblages are suspected, utilising novel techniques such as eDNA surveys
- maintaining short-sward, nutrient-poor grassland where the most important assemblages of waxcap fungi are known to be present
- improving our understanding of how waxcaps fit within habitat mosaics such as wood pasture systems

Priority 17: **Create and connect wildlife-rich grassland**

Create or restore 2,850 ha of grassland to be wildlife-rich by 2035, creating an appropriately managed and connected network that increases the biodiversity of grasslands and soils.

G2

Enhance/restore existing grasslands to be wildlife-rich by:

- maintaining an ecologically appropriate grazing and/or cutting regime
- adding local provenance green hay
- adding local provenance brush harvested seed and wildflower plugs
- leaving rough margins where appropriate
- removing trees, scrub, and woodland, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework
- removing nutrient inputs
- manging soil nutrient levels where they are high and need reducing by topsoil stripping and/or short term no till arable cropping

G8

Create new areas of wildlife-rich grassland targeting non-grassland sites such as previous quarries, ex-industrial land, landfill sites, and built-up areas by:

- adding local provenance green hay
- adding local provenance brush harvested seed and wildflower plugs
- maintaining an ecologically appropriate grazing and/or cutting regime
- managing soil nutrient levels where they are high and need reducing by topsoil stripping and/or short term no till arable cropping
- creating/improving suitable habitat for metapopulations of small blue butterfly to form

G9

Restore wildlife-rich floodplain meadows where soil type, hydrology, and plant community are appropriate, using established techniques such as:

- restoring natural hydrology
- adding local provenance green hay
- adding local provenance brush harvested seed and wildflower plugs
- maintaining an ecologically appropriate grazing and/or cutting regime
- removing nutrient inputs
- avoiding soil compaction by carefully planning stocking densities and performing any mechanical works in the dry months of the year

O26 Create new food, shelter, and nesting opportunities on arable land and productive grasslands, such as:

- nesting plots for birds
- beetle banks
- sowing bird and pollinator friendly seed mixes
- leaving rough margins and scrub

G4 Work with national infrastructure operators, local authorities, and landowners to manage verges, transport corridors, and public rights of way to be wildlife-rich, and maintain existing wildlife-rich habitats by:

- timing cutting to benefit plant species biodiversity
- removing arisings
- reintroducing missing plant species through scarification and seeding

G5 Increase species diversity and reduce nutrient levels in and around wildlife-rich grasslands by:

- reducing the use of pesticides and herbicides
- reducing the use of artificial inorganic and organic fertilisers

G6 Support grassland restoration by:

- creating a county wide hay market and register
- sharing cut and collect equipment
- exchanging seeds and sharing storage to enable sourcing and propagation of more locally appropriate seed to be used in restoration and enhancement
- establishing flying flocks and herds

G7 Develop a propagation programme in nurseries to support the translocation of rare and locally extinct grassland plant species that have been lost or have declined, using:

- local/appropriate provenance seed (propagules)
- specialist direction/advice

Priority 18: **Limestone pavement**

Maintain the extent of the existing pavement resource, including open, wooded, and fragmented pavement, enhance the condition of 450 ha, and maintain the condition of the rest of the resource.

G10 Manage limestone pavement as a mosaic of associated wildlife-rich habitats (to facilitate a diverse vegetation structure with a wide range of microclimates that supports a range of species including key plants and butterflies associated with limestone) by:

- coppicing pavement edge limestone woodlands
- managing scrub (where appropriate) on rotation to create light sunny areas
- controlling the encroachment of bracken, bramble, and cotoneaster
- translocating key butterfly food plants (of local or appropriate provenance) such as primrose, cowslips, and violets
- Maintaining ecologically appropriate grazing regimes (including targeted no fence grazing) using hardy native breeds

G11 Identify, survey the extent and condition, and map all limestone pavement and associated geology, habitat and species to inform future management.

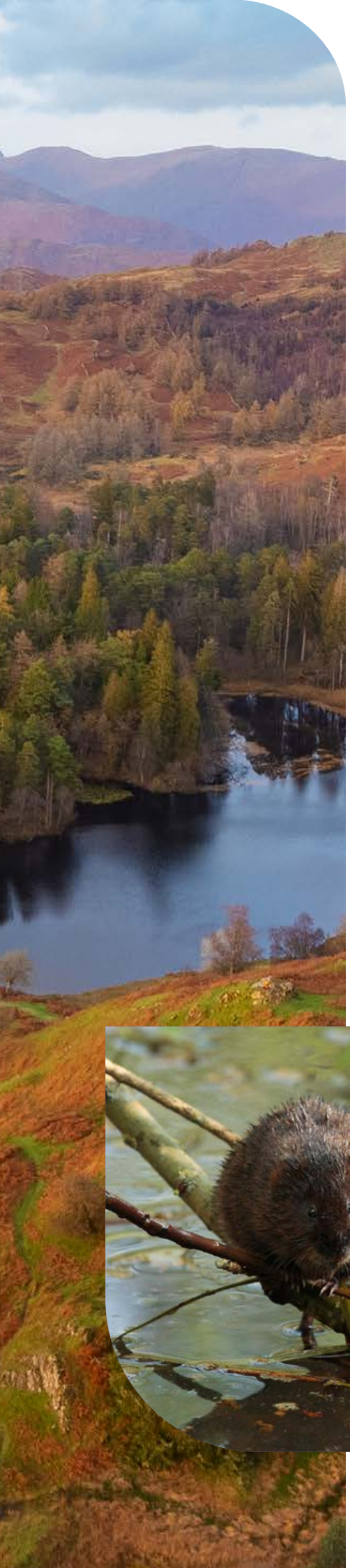
G12 Set clear objectives for the management of each limestone pavement and associated habitats and species through the development of limestone pavement management plans.

G7 Develop a propagation programme in nurseries to support the translocation of rare and locally extinct grassland plant species that have been lost or have declined, using:

- local/appropriate provenance seed (propagules)
- specialist direction/advice

Hay meadow at High Borrowdale, near Tebay

Wetland and freshwater



Habitats

The habitat group of 'wetland and freshwater' is made up of the following wildlife-rich habitats:

- **Rivers and streams**
- **Lakes, tarns, and ponds**
  Oligotrophic and dystrophic lakes, mesotrophic lakes, eutrophic standing waters, ponds, aquifer fed naturally fluctuating water bodies
- **Fen, marsh, and swamp**
  Upland flushes fens and swamps, purple moor grass and rush pastures, lowland fens, reedbeds, wildlife-rich floodplain wetland mosaics
- **Lowland raised bog**

This habitat group also considers other modified water bodies, and other wetland habitats.

Opposite: Tarn Hows
Below left: Water vole, Below right: Derwentwater

© Natural England/Paul Lacey

Rivers and streams

Rivers and streams connect the entire county. They form a **complex network** that flows through all our habitats from the highest mountain summits to the estuaries of the Solway Firth, Irish Sea, and Morecambe Bay. There are thousands of kilometres of rivers and streams flowing through Cumbria. Most of our rivers are considered semi-natural, with characteristic bed, channel, and bank features adjacent to a diverse range of habitats within their floodplains and wider catchments.

The rivers of Cumbria are grouped into six distinct catchments, and each have their own River Basin Management Plan. The **Kent and Leven** catchment comprises the rivers Kent, Leven, Crake, and Bela, which drain the south-eastern fells of the Lake District into Morecambe Bay. The **south-west Lakes** catchment includes the rivers Ehen, Calder, Irt, Mite, Esk, and Duddon, which originate in the south-western fells and flow into the Irish Sea. To the north, the **Derwent north-west** catchment encompasses the Derwent, Cocker, and Ellen, draining the northern and north-western Lake District into the Irish Sea.

The **Eden and Esk** catchment covers the Eden Valley between the Lake District and the North Pennines, from its source above Kirkby Stephen through Appleby, Penrith, and Carlisle into the Solway Firth. Other principal rivers in this catchment include the Caldew, Eamont, Petteril, Esk, and Irthing. The **Waver and Wampool** catchment includes the rivers flowing from the northern edge of the Lake District into the Solway Estuary. Lastly, the **Solway Tweed** catchment covers the Solway Firth and smaller watercourses that extend into the Scottish Borders, forming part of the wider Solway Tweed river basin district.

The fells of Cumbria also feed the catchments of three other major rivers which extend beyond the county boundaries. The source of the River Lune is in the Howgill Fells which flows south and west into Lancashire. Several small rivers flowing east from the North Pennines form the upper parts of the catchments of the rivers Tees and South Tyne.

River Lowther

Windermere

▶ Lakes, tarns, and ponds

Cumbria is well known for its **freshwater lakes**, created through glacial processes thousands of years ago. This is where the Lake District National Park gets its name. Lake Windermere is possibly the most famous as it is the largest freshwater body in England. It's well known by locals and visitors and is arguably the most studied. Smaller lakes, locally known as **'tarns'**, and **ponds** are found throughout Cumbria. Most of the main valleys of the Lake District have large lakes within them, and almost innumerable tarns can be found on the fells. There are thousands of lakes and ponds across Cumbria. Ponds hold water for at least four months of the year and are found throughout the lowland areas in the county.

▶ Fen, marsh, and swamp

Fen, marsh, and swamp are **wet, waterlogged and muddy habitats** with distinct characteristics. A **marsh** is characterised by mineral soils that are poorly drained, and habitat composed of mainly grass species. Coastal and floodplain grazing marsh is the most extensive of this habitat, found on low-lying areas around the Solway Basin and Morecambe Bay. The best examples of coastal and floodplain grazing marsh are incredibly wildlife-rich. However most have been embanked, drained, and agriculturally improved. Biodiversity quality varies greatly as a result. A **fen** is a type of peatland formed when groundwater seeps into a depression on clay soils. A **swamp** is characterised by waterlogged soils which are interspersed with areas of dry land, and they usually have lots of trees.

Fen, marsh, and swamp are found throughout Cumbria. Purple moor grass and rush pasture, reedbed, and lowland fen can be found around Bassenthwaite Lake, Derwentwater, and other lakes in the Lake District. Basin mire (fen) can be found in the Eden valley, and upland springs and flushes found throughout the Lake District, Orton Fells, and North Pennines. Other wetland habitats such as **marginal vegetation** occur around many of our lakes, tarns, ponds, canals, and reservoirs. These habitats often occur as part of **floodplain wetland mosaics**, which can include a range of naturally wet habitats including fen, bog, grassland including floodplain meadows, wet woodland, and open water.

Lowland raised bog, Glasson Moss

▶ Lowland raised bog

Lowland raised bog is an area of **peatland fed predominantly by rainwater**. It develops primarily in lowland areas such as the head of estuaries, along river floodplains, and in localised depressions. Cumbria is one of the most important areas in England for lowland raised bog, with over 4,000 ha of this habitat recorded in the county. This represents 45% of the lowland raised bogs in England[39]. Large areas are found on the coastal plains of the Solway Estuary, the Duddon estuary, and around Morecambe Bay. Lowland raised bog can also be found inland, though usually in more confined, smaller sites.

▶ Other water bodies

Other water bodies within Cumbria include modified water bodies such as **canals** and **reservoirs**. There are numerous reservoirs throughout Cumbria, which play a critical role in supplying drinking water to our major northern towns and cities. There are only two short canals in the county – Lancaster Canal and Ulverston Canal.

39. Cumbria BogLIFE (2010). *Project Information Note: Bringing Cumbria's Raised Bogs to Life.* Available at https://assets.publishing.service.gov.uk/media/5a74b370ed915d502d6ca44d/cumbria-boglife-project-leaflet.pdf

Peatland restoration at Haybridge Moss

Where to see

- **Rivers** – Eden, Kent, and Derwent
- **Lakes** – *Within the Lake District:* Bassenthwaite Lake, Ullswater, Wastwater, Derwentwater, Blea Water, Devoke Water, Red Tarn, Elterwater, Innominate Tarn, and Ennerdale Water. *Outside the Lake District* – Talkin Tarn, Tindale Tarn, Thurstonfield Lough, Sunbiggin Tarn, and Urswick Tarn
- **Purple moor grass and rush pasture, reedbed, and lowland fen** – Bassenthwaite Lake, Derwentwater, and Esthwaite Water
- **Basin mire** – Cliburn and Newton Reigny Mosses
- **Upland springs and flushes** – Torver Commons, Claife, Tarn Hows, Orton Fells, and on the Pennine fells around Cross Fell and Great Dun Fell
- **Lowland raised bog** – South Solway Mosses NNR, and Drumburgh Moss nature reserve, Roudsea Wood and Mosses NNR, the Duddon Mosses NNR, and Foulshaw Moss and Mealthop Moss nature reserves, Rusland Moss NNR

Wetland at Park End Moss, Sizergh

Species

Wetland and freshwater habitats support various aquatic species. These include Atlantic salmon, sea and brown trout, lamprey species, freshwater pearl mussel, and eel. They also include aquatic plants, macrophytes, mammals such as otter and a range of insect and bird species. As a result, several lakes and rivers, including the Derwent, Eden, Kent, Ehen, Ennerdale, and Wastwater are designated for the importance of their habitats and the species they support. The main species that our wetland and freshwater habitats support have been grouped into the following assemblages.

Rivers and streams

This includes the key threatened species that rely on clean, naturally functioning rivers to survive. It includes species such as the British dipper, **Atlantic salmon**, European eel, smelt, brown trout, lampreys, **white-clawed crayfish, freshwater pearl mussel**, river jelly-lichen, **water vole**, and otter.

Lakes

This includes the key threatened species that live in or around our lakes. This includes **schelly, vendace, Arctic charr**, slender naiad, floating water plantain, and osprey.

Tarns, ponds, and canals

This includes key threatened species that rely on our ponds and tarns to survive. Species include the great crested newt, common toad, and medicinal leech.

Wetland, fen, and reedbed

This includes the key threatened species that are associated with these habitats. These include bittern, willow tit, **willow gloves fungus**, marsh fragrant orchid, and milk-parsley.

Lowland raised bog

This includes the key threatened species that are associated with lowland raised bog. Species include birds such as nightjar and marsh tit, and plants such as great sundew, large yellow sedge, and a range of mosses including *Sphagnum austinii*. It also includes invertebrates such as **white-faced darter**, argent and sable moth, **rosy marsh moth**, **window-winged sedge**, and the large heath butterfly.

LNRS priority species requiring bespoke action

- **White-faced darter** – this is a small, dark dragonfly with a distinctive white head. It inhabits peatlands with deep bog pools and is currently only found in a handful of sites across England. They have recently been reintroduced at Drumburgh Moss NNR.
- **Rosy marsh moth** – this moth inhabits wetlands such as fen, moss, and bog. Believed to be extinct in England since the 1860s, it was found at Roudsea Wood in Cumbria in 2005.
- **Arctic charr, vendace, and schelly** – these fish are relics from the last ice age and exist at their southernmost extent in Cumbria. Associated with our cool, well-oxygenated lakes, they are particularly vulnerable to declines in water quality from pollution and increases in temperature from climate change.
- **Atlantic salmon** – this fish is found in the cleanest rivers, mostly in the north and west of the UK. It spends most of its life at sea but returns each year to the same stretch of river or stream in which it hatched to spawn.
- **Freshwater pearl mussel** – this mollusc can live for more than 100 years and filter around 50 litres of water per day. They depend on cool, clean, fast-flowing rivers with coarse sand and gravel beds.
- **White-clawed crayfish** – this is the UK's only native crayfish and is in decline due to the introduction of the North American signal crayfish, reduction in habitat quality and disease. It is associated with small shallow streams with a stony bed.
- **Water vole** – this semi-aquatic rodent lives along rivers, streams, ditches, and in areas of marsh or wet moorland. They are under threat due to predation by American mink and loss of suitable habitat.

- **Window-winged sedge** – this endangered day-flying caddis fly lives in damp, tussocky vegetation. It is found at only a few lowland raised bog and heath sites in the UK, including one location in south Cumbria. It is at risk from habitat deterioration and needs a mosaic of specific habitat features to support it through its life cycle.

White-clawed crayfish

Freshwater pearl mussel

Pressures and threats

The key pressures and threats that affect the condition and extent of our wetland and freshwater habitats include[40]:

- **pollution (nutrient, chemical, and sediment)**
- **air quality and nitrogen deposition**
- **physical modification**
- **land and water management regimes**
- **invasive non-native species**
- **climate change**
- **recreation**

Our rivers, lakes and ponds, and wetlands are all vulnerable to **pollution** from a range of sources. These include: the discharge of wastewater from combined sewer overflows or septic tanks; agricultural runoff (nutrients and sediment); drainage from roads; and mining, industrial and urban runoff. They also include the build-up of chemicals and plastics within our water environment. These can all have dramatic impacts on the water quality of our freshwater habitats, and subsequently on the species that they support. Air quality issues such as nitrogen deposition can also impact water quality, leading to increased growth of nitrogen-loving species which outcompete other more sensitive species. Just over half our water bodies assessed under the water framework directive achieved good ecological status in 2019. None met good chemical status[41]. The main reasons for not achieving good status were pollution from rural areas and physical modifications.

40. Environment Agency (2022). *River Basin Management Plans, updated 2022: Challenges for the Water Environment.* Available at www.gov.uk/government/publications/river-basin-management-plans-updated-2022-challenges-for-the-water-environment
41. Environment Agency (2024). *Catchment Data Explorer.* Available at: https://environment.data.gov.uk/catchment-planning

In order to function as they should, our wetland and freshwater habitats should have good water quality and good physical and ecological function. This should include natural processes such as erosion, deposition, connection to floodplains, natural hydrology, and well-developed lakeshore habitat. In Cumbria, many of our rivers and lakes have been modified in some way, either to protect from flooding, increase productive land, and enable transport, or to support **abstraction** for drinking water and food production. These **modifications** mean that many of our freshwater habitats do not function in the way they should. They cannot support the full range of habitats and species that they would otherwise be able to. In addition, whilst these modifications may protect certain areas from flooding, they can increase flood risk downstream.

Invasive non-native species can be a problem across all habitat types. They are particularly problematic in freshwater environments as the flow of water can help them spread much further and faster. Invasive non-native species such as New Zealand pygmyweed, Himalayan balsam, American mink, and North American signal crayfish can outcompete other native species. This can alter riverbanks, increase erosion, and cause the decline and potential local extinction of native species. They can also be damaging to human and animal health.

Climate change increases the impact of other pressures on our wetland and freshwater habitats. Hotter summers, wetter winters and more extreme weather events have the potential to affect both water quantity and water quality. They can also: put increased pressure on threatened species; potentially increase the spread of invasive non-native species; increase pressures on water supplies; increase the impacts of pollution events; increase flood risk; increase water temperature; and alter flow regime.

Our freshwater habitats also support a range of recreational activities. These include boating, paddleboarding, swimming, gorge scrambling, angling, dog walking, or just picnicking or creative activities such as photography. Whilst our freshwater habitats are a core part of Cumbria's tourism activity, this **recreational pressure** can also contribute to pollution, erosion of lake shores and riverbanks, disturbance of sensitive species, or the spread of invasive non-native species and the introduction of waterborne diseases.

Other management regimes have also had a negative impact on the condition of our wetland and freshwater habitats. These regimes include the **removal of peat** from lowland raised bog for horticultural purposes, and the **drainage** of wetland areas to improve their suitability for livestock. It also includes using rivers and ponds as drinking water for livestock.

Opportunities for recovery and wider benefits

Restoring natural processes to our wetland and freshwater habitats and creating the space for them to function more naturally can slow the flow of water through the catchment. It can increase the amount of water stored upstream and reduce the impacts of flooding in our built-up areas through **natural flood management**. Restoring natural flows can also provide resilience to drought. Nature-based solutions will be an essential part of increasing our resilience to the impacts of climate change.

Naturally functioning wetland and freshwater habitats can also improve water quality. Structurally complex habitats such as wetlands, wet woodland, and lowland raised bog can act like a natural filter and prevent sediment and nutrients from running into rivers and lakes. This **improves water quality** and reduces the cost of treatment for drinking water. Naturally

Friends swimming in River Duddon

functioning complex habitats also support a wider range of species. This, along with improvements in water quality and the removal or adaptation of barriers such as weirs to improve connectivity, can all aid the recovery of freshwater and wetland species.

Healthy wetlands and lowland peatlands can **store large amounts of carbon**. The waterlogged conditions prevent plants from decaying and lock away the carbon stored within them which accumulates over thousands of years to form peat. Eroding and degraded peatlands can release large amounts of this previously stored carbon into the atmosphere. Restoring our degraded peatlands is a key tool for reducing our contribution to climate change.

Clean rivers and lakes can also deliver multiple **health and wellbeing benefits** to those who use our freshwater habitats for recreational activities. Enhancing and restoring these habitats will help the species that inhabit them. It also improves the relationship that people who live, work or visit Cumbria have with our landscape.

Changes in national environmental and agricultural policy provide multiple support mechanisms to restore natural function to, and improve the quality of, our wetland and freshwater habitats. However, a step change in land use change is required to meet the water quality targets in many of our catchments. Research and funding for natural flood management has become more and more established over the last 10 years, as have accredited carbon offsetting schemes.

The government's Environmental Improvement Plan has four national environmental objectives that specifically relate to the condition of our wetland and freshwater habitats. These are to:

- **restore 75% of our water bodies to good ecological status**
- **reduce nitrogen, phosphorus, and sediment pollution from agriculture going into the water environment by at least 40% by 2038** (with an interim target of 10% by 2028, or 15% for catchments containing protected sites in unfavourable condition due to nutrient pollution)
- **reduce phosphorus loadings from treated wastewater by 80% by 2038** (with an interim target of 50% by 2028)
- **halve the length of rivers polluted by harmful metals from abandoned mines by 2038**

The Environmental Improvement Plan identifies wetland creation as a key mechanism for meeting these national environmental objectives.

Priorities and potential measures for nature recovery

Our vision for wetland and freshwater is:

"Naturally functioning wetland and freshwater habitats, with excellent water quality and ecological condition throughout each catchment."

The following priorities and potential measures have been identified to help us achieve our vision. Measures including a place marker are mapped and can be viewed on the Local Habitat Map.

Priority 19: **Restore natural function/processes**

Restore natural processes and hydrology to our wetland and freshwater habitats, with 200 km of rivers restored, connected to their floodplains, and 500 ha of good quality riparian, lake shore, and wetland habitat created by 2035.

F1

Support natural processes and function in river channels, floodplains, and lake shores, to benefit the habitats and species they support, through appropriate river restoration and re-naturalisation techniques, including:

- re-naturalising modified channels, particularly in headwaters and tributaries
- reconnecting floodplains
- allowing accumulation of woody material
- facilitating natural flow management
- allowing natural sediment movement and storage
- controlling INNS (including preventing further introductions and spread of disease through biosecurity measures)

F2

Manage canals and their riparian habitats to be wildlife-rich by:

- encouraging the growth of native emergent, floating, and submerged aquatic vegetation
- providing refuges for invertebrates and birds in fringing bankside habitat and reedbeds
- Controlling INNS (including preventing further introductions and spread of disease through biosecurity measures)

F3

Create new, restore existing, and continue to manage a variety of wildlife-rich wetland habitats including ponds, scrapes, and wet woodland by:

- encouraging natural water retention
- maintaining varied depths for a range of species/habitat communities
- fringing with appropriate marginal vegetation
- providing refuges for water voles and birds such as islands and reedbeds
- avoiding stocking with fish or wildfowl

F4

Restore natural species movement where movement is impeded, by:

- removing redundant artificial barriers in river channels and lakes
- installing appropriate alternative passage where barrier removal is not possible
- installing under/over road tunnels/bridges near known habitat severance or breeding sites

F5

Establish wide riparian buffer strips of wildlife-rich habitats where livestock can be excluded, in suitable areas, to minimise nutrient and sediment input into watercourses, water bodies, and wetlands.

F6

Develop and implement a programme of lake management/restoration plans to restore natural function and habitats.

F7

Carry out targeted reintroduction programmes for ecosystem engineers such as beaver.

O13

Protect sensitive habitats against the impacts of recreational pressure by:

- utilising partnership working to ensure consistent messaging
- funding wardens and engagement officers
- providing access management including fencing, groundworks, and considering the use of public space protection orders
- providing training
- delivering footpath improvements
- promoting responsible recreational behaviour
- considering the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites
- providing education on dangers of wildfire

W6

Create more woodland and tree cover (if supported following application of open habitats policy, wader guidance, and the peatland decision support framework), targeting the following wildlife-rich woodland types:

- wet woodland (targeting floodplains, riparian zones, and plateaus)

Bespoke species-specific measures

Arctic charr, vendace, and schelly

S14 Carry out research to monitor populations of Arctic charr, vendace, and schelly, and identify their potential conservation requirements, including:

- genetic studies into their vulnerability to climate change and water abstraction
- population assessments and spawning site surveys
- identifying sites for potential translocations if found necessary
- investigation into the control of non-native fish

S15 Avoid stocking lakes and tarns which contain Arctic charr, vendace, and schelly, and enforce the ban on live bait fishing for Arctic charr.

Atlantic salmon

S16 Increase populations of Atlantic salmon in Cumbria by:

- continuing to monitor and study of populations (adults and smolt) particularly with reference to diet
- avoiding new stocking of salmon in Cumbrian rivers and the Solway Firth to protect wild species genetics
- continuing the mandatory 100% catch and release of salmon until stocks have sufficiently recovered

White-clawed crayfish

S17 Safeguard white-clawed crayfish populations in Cumbria by:

- carrying out further research into removal of signal crayfish
- preventing further introductions of signal crayfish and the spread of crayfish plague by adopting biosecurity measures
- focusing conservation efforts above natural barriers such as waterfalls
- identifying potential ark sites and preparing emergency plans for translocation

Freshwater pearl mussel

S18 Carry out further research to monitor populations of freshwater pearl mussel, and identify their potential conservation requirements, including:

- conducting research into genetics of local populations
- surveying rivers for existing populations using eDNA
- carrying out captive breeding and suitable translocation programmes

Water vole

S19

Safeguard and expand populations of water vole in Cumbria by:

- managing bankside vegetation on rotational basis, limiting intensive grazing and trampling where water vole populations are known to be present
- carrying out translocations from appropriate water vole colonies to suitable sites where habitat conditions are optimal
- carrying out dedicated mink eradication measures at a landscape scale

Priority 20: **Enhance and restore wetland habitats**

Maintain, restore or enhance 3,250 ha of lowland raised bog, and 2,000 ha of lagg and wetland habitat to be in good condition and under appropriate management by 2035.

F8

Restore hydrological function and species diversity on drained lowland raised bog and fens/ degraded peatlands using established techniques such as:

- installing bunding
- reprofiling peat faces
- installing dams
- using coir matting to revegetate bare peat
- spreading mulch
- sphagnum inoculation
- seeding and plug planting
- removing trees, scrub, and woodland, if supported following the application of open habitat policy, wader guidance, and the peatland decision support framework

F9

Create and restore wildlife-rich fringe habitats (such as wet woodland, purple moor grass and rush pasture, reedbeds, transition mires, and floodplain meadows) around peatland and wetland habitats by:

- restoring hydrology within wider hydrological units
- appropriate management for the type of habitat
- managing wet grassland and rush pasture for breeding waders (generally with cattle grazing and by controlling soft rush) where they are known to breed
- ensuring sufficient open-habitat remains in and around known important nesting areas for breeding waders
- creating wet areas where waders are present for them to feed during spring and summer

F10

Manage wetland habitats including basin mires, fens, and flushes to be wildlife-rich by:

- maintaining ecologically appropriate grazing regimes
- restoring natural hydrology
- managing scrub
- reducing nutrient inputs from surrounding habitats
- avoiding soil compaction by carefully planning stocking densities and performing any mechanical works in the dry months of the year

F11

Cease all extraction of peat.

F3

Create new, restore existing, and continue to manage a variety of wildlife-rich wetland habitats including ponds, scrapes, and wet woodland by:

- encouraging natural water retention
- maintaining varied depths for a range of species/habitat communities
- fringing with appropriate marginal vegetation
- providing refuges for water voles and birds such as islands and reedbeds
- avoiding stocking with fish or wildfowl

G9

Restore and create wildlife-rich floodplain meadows where soil type, hydrology, and plant community are appropriate, using established techniques such as:

- restoring natural hydrology
- adding local provenance green hay
- adding local provenance brush harvested seed and wildflower plugs
- maintaining an ecologically appropriate grazing and/or cutting regime
- removing nutrient inputs
- avoiding soil compaction by carefully planning stocking densities and performing any mechanical works in the dry months of the year

Bespoke LNRS priority species-specific measures

White-faced darter

S20 Investigate the feasibility of translocation projects to encourage colonisation of white-faced darter to new sites.

Rosy marsh moth

S21 Investigate the habitat and foraging needs of the rosy marsh moth and use this to inform:

- site management
- the feasibility of translocation projects to encourage colonisation of new sites.

S22 Maintain and where appropriate expand key food species for rosy marsh moth such as bog myrtle and bog rosemary as part of site management.

Window-winged sedge

S23 Manage lowland raised bog to contain areas of tussocky purple moor grass, interspersed with small shallow pools for window-winged sedge larvae.

S24 Safeguard and expand window-winged sedge populations in Cumbria by:

- undertaking detailed surveys of the physical features of the habitat at their known site, to increase understanding of their needs and potential threats
- using knowledge from surveys to inform management and restoration plans, and identify new sites for potential translocation
- investigating the feasibility of setting up a captive breeding programme to reinforce the known population and aid potential translocations to suitable new sites, under specialist advice

Priority 21: **Water quality**

Improve water quality in wetland, freshwater, coastal, and estuarine habitats, and reduce diffuse and point source water pollution, with 99% of water bodies and coastal waters with good ecological status and 25% with good chemical status by 2035.

F12

Reduce point source pollution from sewage treatment works, combined sewer overflows, package treatment plants, and septic tanks by:

- delivering improvement programmes
- increasing maintenance
- providing education

F13

Reduce the impact of road and urban runoff by:

- improving existing infrastructure
- incorporating high quality SuDS (sustainable urban drainage systems) into new developments and retrofitting them where feasible

F14

Remediate/mitigate against diffuse and point source historical mine discharges.

F15

Develop and fund research projects into using natural processes such as shellfish and reedbeds to improve water quality.

O25

Tackle diffuse pollution and sediment runoff by taking a catchment approach to low-input farming methods, including:

- education and farmer learning
- nutrient management plans
- diffuse water pollution plans
- land use change
- sustainable slurry management
- improved soil management
- grazing and vegetation management
- prevention of unnatural erosion

F5

Establish wide riparian buffer strips of wildlife-rich habitats where livestock can be excluded, in suitable areas, to minimise nutrient and sediment input into watercourses, water bodies, and wetlands.

Opposite: Troutbeck Valley

Coastal and estuarine

Habitats

The 'coastal and estuarine' habitat group of is made up of the following wildlife-rich habitats:

- **Supratidal habitats**
  Maritime cliff and slopes, coastal sand dunes, coastal vegetated shingle
- **Intertidal habitats**
  Coastal saltmarsh, intertidal mudflats, intertidal underboulder communities, sabellaria alveolata reefs, sheltered muddy gravels, peat and clay exposures with piddocks, seagrass beds wildlife-rich coastal saltmarsh and saline reedbeds, wildlife-rich littoral sand, sediment and rock, seagrass beds
- **Subtidal habitats**

All of Cumbria's coastline is under some form of national statutory designation, as part of a MCZ, SAC, or SPA. This recognises the national and international importance of these habitats and some of the species they support. Coastal habitats form highly dynamic systems that are shaped by natural coastal and geomorphological processes over time.

Opposite: Sandscale Haws NNR
Below left: Avocet, Below right: Watercourse draining into Morecambe Bay.

Sandstone cliffs of St Bees headland

▶ Supratidal habitats

Supratidal habitat occurs above the spring high tide line but within the 'splash zone', where the sea still affects it, but it is not submerged by the sea. Supratidal habitats occur along the majority of Cumbria's coast. **Maritime cliffs and slopes** made of boulder clay are present along the west Cumbria coast from Maryport south to Silecroft, except at St Bees Head which is sandstone. **Limestone cliffs** are more restricted, being most prominent at Humphrey Head near Grange-over-Sands, and west of Arnside.

Major **sand dune** systems are to be found at the mouth of the Duddon Estuary, Drigg Estuary, and between Silloth and Maryport. **Vegetated shingle** is a rare habitat, though unvegetated shingle is more widespread. Tidal islands and post-industrial habitats often act as a proxy for vegetated coastal shingle. Although often smaller in extent, these habitats support significant populations of breeding seabirds.

Sea Bindweed, Sandscale Haws NNR

▶ Intertidal habitats

Intertidal habitat occurs between high tide and low tide. It is frequently submerged by the sea, and its form is dependent on coastal location, degree of wave action, and substrate. The intertidal area extends all around the coast of Cumbria but is particularly extensive in the large estuaries of the Solway Firth, Morecambe Bay, and Duddon Estuary, and the smaller estuaries of the rivers Esk and Irt. These are almost exclusively soft sediment habitats such as **mudflat** and **saltmarsh**. Saltmarsh is often managed for agricultural purposes, to provide fodder for livestock. However it is also used for recreation as well as supporting a range of important coastal species.

Intertidal bedrock is largely restricted to around St Bees Head and north of Whitehaven. Intertidal boulders and cobble scars, formed from eroded glacial drift, are found extensively on the open coast of Cumbria and to a lesser extent within the estuaries. **Honeycomb worm *Sabellaria alveolata* reefs** are found at various locations along the Cumbrian coast between Walney Island and Silloth. **Seagrass** is the only flowering plant that lives fully underwater. Seagrass beds are found in the Walney Channel.

▶ Subtidal habitats

Subtidal habitat occurs below low tide. Below the tidal limit Cumbria's seabed is almost entirely **mud, silt, sand, and gravel** sediments. **Saline lagoons** are restricted to a small number of sites found in man-made locations, such as docks, gravel, and mine workings. These habitats can support significant populations of breeding seabirds. Although the subtidal/marine habitat is outside the scope of the LNRS, the limit for which ends at mean-low-water, it is important to recognise the inherent connectivity between all terrestrial and marine environments.

Some habitats and species will transition between the coastal and marine environment, and even between terrestrial and freshwater habitats. Management practices on land can have a direct impact on our marine environment. For example, the water quality of our inland rivers will directly impact on the quality of our coastal waters. Therefore, our nature recovery priorities delivered through this LNRS will have some impact on the marine environment, particularly through the connectivity between freshwater and marine habitats.

Saline lagoons, Barrow-in-Furness

Where to see

- **Cliffs** – St Bees Head, Humphrey Head
- **Sand dune** – Sandscale Haws, North Walney and Haverigg Dunes, Ravenglass and Eskmeals Dunes
- **Coastal vegetated shingle** – Walney and Foulney Islands, the Solway Firth.
- **Mudflats and saltmarsh** – Solway Firth, Morecambe Bay, and Duddon Estuary
- **Saline lagoons** – the gravel pits on Walney Island (SPA and SAC), Hodbarrow Lagoon (SPA and SAC), and docks at Whitehaven, Workington, Maryport and Silloth

Sand dunes at Sandscale Haws NNR ©National Trust Images/L Browne

Species

Our coastal habitats support various species of national and international importance. These include breeding and wintering birds such as wildfowl, waders, and sea birds. It also includes a variety of unique plant and animal species, such as natterjack toads. The main species that our coastal habitats support have been grouped into the following assemblages.

Saltmarsh and intertidal

This includes threatened species that occupy our intertidal areas, either permanently, to breed, or to overwinter. Species include smelt, birds such as redshank, avocet, **ringed plover,** oystercatcher, and eider duck. It also includes several species of gull and tern (including little tern, sandwich tern, Arctic tern, and common tern), and plants such as saltmarsh thread-moss and eelgrass.

Dunes and wet slacks

Threatened species that live in our dune systems include the **small blue butterfly, northern dune tiger beetle, natterjack toad,** dune helleborine, grass of Parnassus, upright forget-me-not, coralroot orchid, and heath dog violet.


©Natural England/L Browne

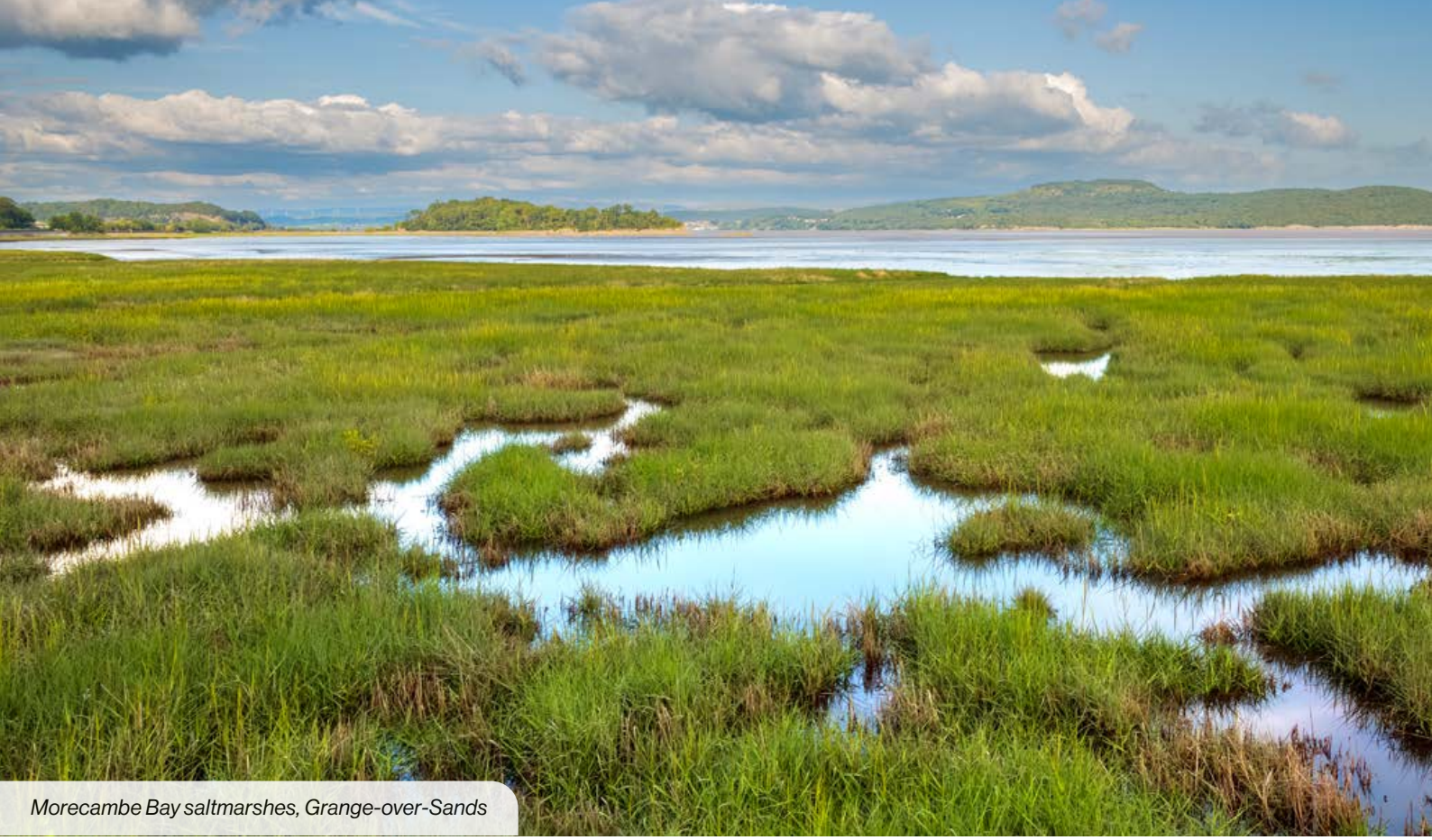
Conservation grazing at Mawbray Banks NNR

LNRS priority species requiring bespoke action

- **Natterjack toad** – this rare toad lives in shallow pools on sand dunes and sandy heaths. The Cumbrian coast is a stronghold for this species, which is only found in a few other locations in England. The loud call made by mating males can be heard up to a mile away.
- **Northern dune tiger beetle** – this large, distinctive beetle is red/brown with three light coloured stripes and an iridescent green underside. Although widespread throughout Europe, in Britain there are only two populations at coastal sand dune sites in north-west England, one of which is in Cumbria. It is under pressure from habitat changes resulting in fewer areas of bare sand. Habitat changes include the spread of invasive plant species, reduction in grazing from rabbits, and increasing rates of vegetation succession, as well as localised recreational disturbance affecting larval habitat.
- **Ringed plover** – this small, short-legged, wading bird mostly breeds on beaches around the coast. They are also known to breed in sand and gravel pits and former industrial sites. They are very sensitive to disturbance. Many are resident birds that live here all year round, but some pass through on migration or overwinter from Europe.
- **St Bees seed-eater** – this rare ground beetle is only found near St Bees. It is associated with bare and disturbed ground at the base of the sandstone cliffs, where it feeds on the seeds of ruderal plants. The population is potentially vulnerable to coastal dynamics and vegetation succession.


Natterjack toads ©National Trust Images/Neil Forbes


Ringed plover ©Natural England/Allan Drewitt



Morecambe Bay saltmarshes, Grange-over-Sands

Pressures and threats

The key pressures and threats that affect the condition and extent of our coastal habitats are[42]:

- **climate change**
- **recreational disturbance**
- **pollution**

Coastal habitats are relatively narrow strips that are transitional in their nature. They're often constrained by the presence of engineered sea defences designed to protect property, roads, railways, and farmland from flooding. As sea levels rise due to **climate change**, these coastal habitats will be squeezed even more, being eroded by the sea but with nowhere to move inland. For coastal habitats to be resilient to climate change, they will need to have the space to be dynamic and move further inland as sea levels rise.

The coast is easily accessible and a very popular leisure destination for large numbers of people. However, **recreational pressure** can have a huge impact on our coastal environment. Large numbers of walkers, dogs, and angling can damage fragile habitats and disturb wildlife including breeding birds and seals.

Our coastal habitats are vulnerable to **pollution** from a range of sources. These include: the discharge of wastewater from the water industry; runoff from agriculture, industry and built environment; drainage from roads; litter and plastic pollution; lighting; and the build-up of chemicals and plastics within our water environment. As all our lakes, rivers, and streams eventually flow into the sea, the different sources of pollution are compounded at our coast. This can have a dramatic impact on water quality around our coast, and subsequently the species that it supports.

42. The wildlife trusts (2024). *Coastal.* Available at www.wildlifetrusts.org/habitats/coastal

Opportunities for recovery and wider benefits

Restoring natural processes to our coastal habitats, and creating the space for them to function naturally, can increase their **resilience to climate change** as well as our own. The impacts of climate change induced sea level rise will be felt most at the coast. Combining hard engineered coastal defences with dynamic coastal habitats and managed coastal retreat will be an essential part of our adaption to the changing climate.

Improving the condition of habitats such as saltmarsh and dune systems in suitable locations can absorb the energy of the sea. This can protect the land behind it, complementing or providing an **alternative to traditional hard engineering** such as sea walls or gabions. These nature-based solutions play an important part in managing flood and coastal erosion risk and can be used as part of each of the different approaches identified in the Shoreline Management Plan[43]. Some coastal habitats such as seagrass beds and saltmarsh also **absorb carbon** in the same way that woodland and peat bog does.

Much of Cumbria's permanent population lives within 5 km of the coast. Many of the county's major towns are located along the coastline between Bowness on Solway and Barrow-in-Furness. Clean and naturally functioning coastlines can deliver multiple **health and wellbeing benefits** to those who live near them or use them for recreational activity. Enhancing and restoring these habitats will help the species that inhabit them, and the communities that live alongside them. Working with communities could also help reduce recreational pressure on the most sensitive habitats and encourage participation to reduce litter and wildfires.

The government's Environmental Improvement Plan has two national environmental objectives that specifically relate to our coastal and estuarine habitats. These are to:

- **ensure that 70% of designated features in Marine Protected Areas (MPAs) are in favourable condition by 2042 (48% by 2028), with the remainder in recovering condition**
- **double the number of government funded projects which include nature-based solutions to reduce flooding and coastal erosion**

43. www.gov.uk/guidance/shoreline-management-plans

©Cumbria Tourism/Cody Dillabough

Family taking a walk along the Maryport coastline

Priorities and potential measures for nature recovery

Our vision for coastal and estuarine is:

"A dynamic coastal environment that supports a well-functioning mosaic of habitats, where a catchment-based approach recognises the importance of connectivity from the uplands through to the coast and marine environment."

The following priorities and potential measures have been identified to help us achieve our vision. Measures including a place marker are mapped and can be viewed on the Local Habitat Map.

Priority 22: **Restore and enhance coastal habitats**

Restore 750 ha of coastal habitats by 2035, and maintain or enhance 75% (7,000 ha) to be in good condition and under appropriate management.

C1

Appropriately manage sand dunes, maritime cliffs and slopes, and coastal vegetated shingle to be in good condition, benefitting the species they support by:

- controlling INNS such as sea buckthorn and Japanese rose
- managing scrub
- maintaining ecologically appropriate grazing regimes
- creating and maintaining undisturbed breeding sites and roosting areas for breeding waders and seabirds that are above the high tide levels and protected from predation
- maintaining and restoring ephemeral water bodies free of vegetation for natterjack toads
- maintaining large areas of bare sand with sparse vegetation, whilst minimising damage to northern dune tiger beetle larval habitat
- working with specialist coastal geomorphologists to develop a wider understanding of the processes acting on coastal habitat

C2

Enhance and restore saltmarsh and coastal grazing marsh habitats so they are wildlife-rich, benefitting the species they support, using established and emerging techniques such as:

- restoring natural hydrology
- creating scrapes to ensure wet areas where waders are present, for them to feed during spring and summer
- maintaining ecologically appropriate grazing regimes to provide suitable habitat for key species (e.g. a grazed tussocky vegetation structure for breeding birds such as redshank and skylark, and a short sward where natterjack toad are found)

C3

Restore and expand seagrass beds to be in good condition using established techniques with a focus on existing mapped areas.

C4

Minimise pressures on mudflats, sandflats, and rocky shores by:

- reducing pollution and nutrient inputs from surrounding habitats
- minimising disturbance to wildlife

C5

Maintain a full transition of vegetational stages of intertidal habitat that will support species of varying salinity tolerance and create a diversity of microhabitats, including:

- ephemeral water bodies
- bare ground for foraging, refuge, and basking
- sand dunes/upper saltmarsh with short vegetation
- shallow freshwater pools with no vegetation
- winter hibernation sites for natterjack toads
- successional habitats for St Bees seed-eater including areas of bare ground and food plants such as sea campion

O13

Protect sensitive habitats against the impacts of recreational pressure by:

- utilising partnership working to ensure consistent messaging
- funding wardens and engagement officers
- providing access management including fencing, groundworks, and considering the use of public space protection orders
- providing training
- delivering footpath improvements
- promoting responsible recreational behaviour
- considering the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites
- providing education on dangers of wildfire

Burgh by Sands

Bespoke LNRS priority species-specific measures

Natterjack toad

S25

Safeguard natterjack toad populations by:

- continuing to monitor and study existing populations
- liaising with landowners and land managers to provide site-specific management advice
- increasing engagement and education to help reduce disturbance and protect habitat
- carrying out conservation translocations to appropriate former sites using genetically suitable donor populations under specialist advice

Northern dune tiger beetle

S26

Investigate the feasibility of translocations of northern dune tiger beetle to other sites and dependent on outcome, trial translocations to suitable new sites under specialist advice.

Ringed plover

S27

Safeguard ringed plover populations and enable breeding success by:

- reducing disturbance in areas where ringed plover are known to nest
- installing nest cages over identified nests to prevent predation

St Bees seed-eater

S28

Survey the St Bees seed-eater population at the known site and historic sites to:

- confirm continued presence
- assess the extent of suitable habitat to help safeguard and expand population.

Priority 23: **Create space for coastal dynamism**

Expand the space available to coastal transitional habitats and restore coastal processes, enabling them to be dynamic and move inland in response to natural processes and climate change.

C6

Restore coastal processes to allow coastal habitats to be wildlife-rich by:

- increasing the space available to them where these have been lost due to coastal squeeze
- maintaining ecologically appropriate grazing regimes
- scrub management
- management of invasive non-native species

C7	Create new areas of saltmarsh in good condition using established and emerging techniques such as managed realignment and coastal retreat.
C8	Develop and implement a strategic approach to potential climate change driven sea level rise, including adaptive coastal management to ensure resilience of coastal habitats.

Priority 21: **Water quality** (as per wetland and freshwater chapter)

Improve water quality in wetland, freshwater, coastal, and estuarine habitats, and reduce diffuse and point source water pollution, with 99% of water bodies and coastal waters with good ecological status and 25% with good chemical status by 2035.

F12	Reduce point source pollution from sewage treatment works, combined sewer overflows, package treatment plants and septic tanks by: • delivering improvement programmes • increasing maintenance • providing education
F14	Remediate/mitigate against diffuse and point source historical mine discharges.
F15	Develop and fund research projects into using natural processes such as shellfish and reedbeds to improve water quality.
O21	Raise awareness of issues and actions everyone can take, such as: • "love my beach" • clean water campaigns • reducing water use • reducing impacts of access and recreation • increasing flood and drought resilience • reducing and removing litter • improving biosecurity • disposing of items such as wet wipes or cooking fats correctly • using sensitively designed lighting in gardens • reducing inputs of medication, pesticides, and biocides into the environment

O25	Tackle diffuse pollution and sediment runoff by taking a catchment approach to low-input farming methods, including: • education and farmer learning • nutrient management plans • diffuse water pollution plans • land use change • sustainable slurry management • improved soil management • grazing and vegetation management • prevention of unnatural erosion

Priority 24: **Marine nature recovery**

Increase our understanding of the threats and pressures on the marine environment, and the potential actions that may be needed to address these.

C9	Develop a baseline dataset and coordinate with partners to build a marine evidence base.

C10	Use knowledge from the designation process of the Highly Protected Marine Area (HPMA) to identify the main pressures on the marine environment.

Opposite: View of the Lake District fells from Sandscale Haws

Built environment

Habitats

The habitat group of 'built environment' is made up of the following wildlife-rich habitat:

- **Brownfield sites**
  Open mosaic habitats on previously developed land

It also includes other developed land such as buildings, gardens, infrastructure, amenity areas, and lower wildlife value brownfield sites and associated green spaces within settlements. These are known collectively as green infrastructure.

Opposite: Carlisle city centre
Below left: Cockermouth, Below right: Appleby-in-Westmorland

▶ City, towns, villages, and hamlets

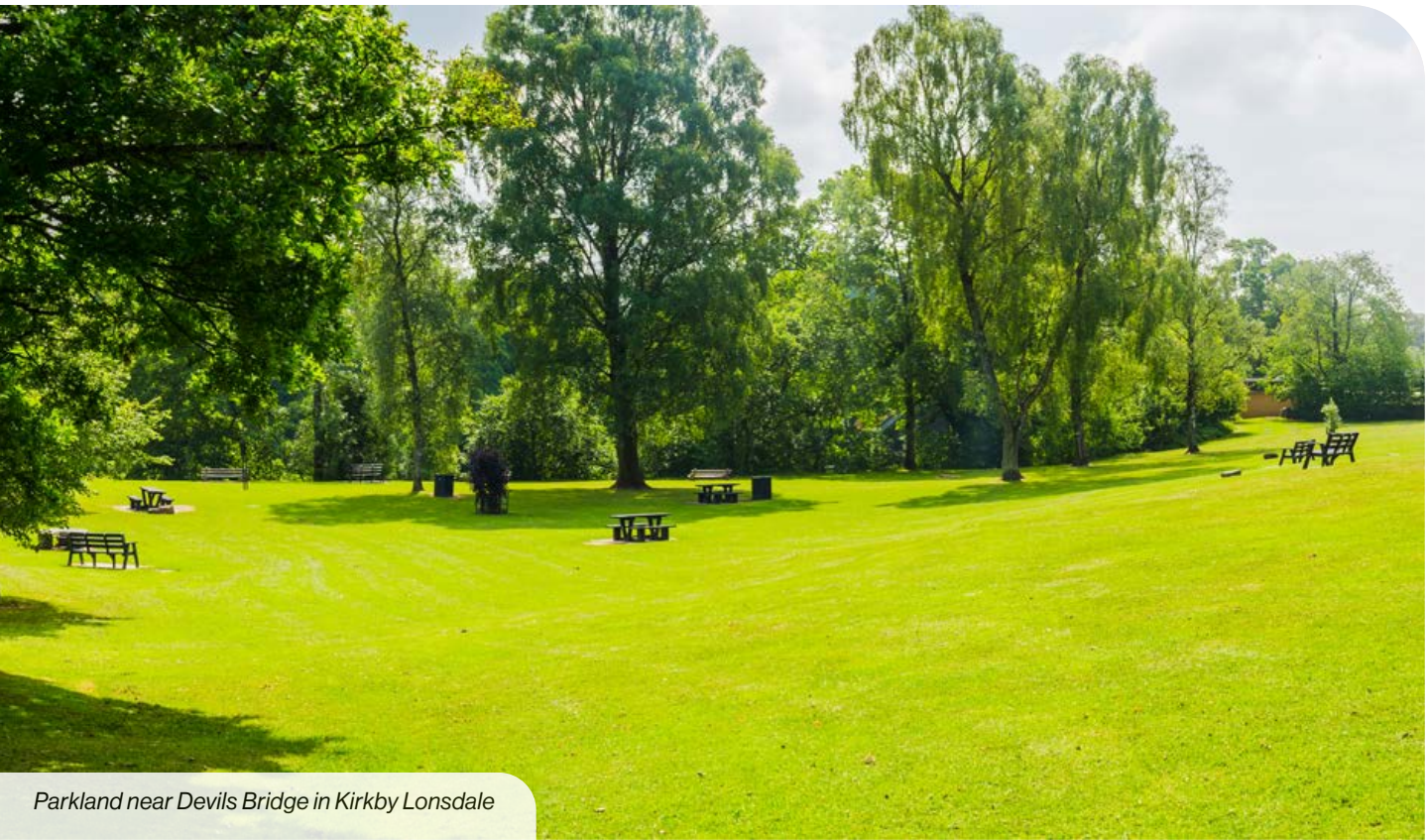
Cumbria contains one **city** – Carlisle – plus several **towns**. The largest (by population size) includes Barrow-in-Furness, Kendal, Whitehaven, Workington, Penrith, Maryport, Ulverston, and Cockermouth. Most of these are located along the coast or within the main river valleys and their floodplains. Whilst our major urban areas generally lie outside our national parks and national landscapes, many designated sites and irreplaceable habitats extend into our urban areas. There are also numerous **smaller towns, villages, and hamlets** throughout Cumbria.

Within Cumbria's built-up areas, **open habitats** consist predominantly of parkland including parks and gardens, cemeteries, riversides, roadsides, canal corridors, smaller areas of amenity open spaces, allotments, and private gardens. Existing **buildings** can also provide important habitat for a range of species.

Linear routes, including former railway lines, road verges, rivers, canals, public rights of way, and green infrastructure routes provide important wildlife corridors. They connect wildlife in urban centres to the surrounding countryside, with river corridors being particularly important.

▶ Brownfield sites

The industrial heritage of many of the county's larger towns has left significant areas of previously developed 'brownfield' land following the decline of mining, iron and steel production, and heavy industry. This land can support a diverse range of distinct plant and animal species, although it is at risk from national policies promoting redevelopment on brownfield land. **Open mosaic habitats** can exist on any brownfield site and so they can be found anywhere in the county, but they are more likely to be in and around larger built-up areas. The former steel works and associated slag banks along the west coast have particularly good examples of this habitat, along with the former industrial land along the west coast at Maryport.



Parkland near Devils Bridge in Kirkby Lonsdale

Kendal

Where to see

- **Parks and public gardens** – Bitts Park, Rickerby Park, Penrith Castle Park, Rothay Park, Barrow Park, Carlisle Cathedral precinct, and Carlisle crematorium
- **Brownfield open mosaic** – Millom Ironworks LNR, the Derwent Howe slag bank in Workington, the slag banks alongside Walney Channel in Barrow-in-Furness, Kingmoor Sidings LNR in Carlisle, Maryport Coast County Wildlife Site

Slag banks, Walney Channel in Barrow-in-Furness

Species

In addition to being the primary 'habitat' that people occupy, our built-up areas also provide important habitat for a range of species. These include nesting birds, bats, reptiles, a range of invertebrates including the small blue butterfly, and numerous plants including purple broomrape and pyramidal orchid. The main species that our built-up habitat supports have been grouped into the following assemblages.

Gardens and brownfield sites

Threatened species which occupy our parks, gardens, brownfield sites, verges, and other greenspaces include several species of bees and butterflies such as the **small blue butterfly** and moss carder-bee. Flowering plants including heath cudweed and yarrow broomrape, and mammals such as hedgehog.

Urban water bodies

Species that live in or around these freshwater bodies include amphibians such as great crested newt and common toad, and mammals such as water vole, otter, and a variety of bat species.

Urban built-up areas

Species that predominantly occupy our built environment, include several bat species, and bird species such as **swift**, house sparrow, and peregrine falcon.

LNRS priority species requiring bespoke action

- **Small blue butterfly** – the small blue is the smallest of all the UK's butterflies. Populations only exist where kidney vetch also grows, as it is the sole foodplant of their caterpillars. In Cumbria, small blue are limited to brownfield former industrial sites and coastal grassland in West Cumbria.
- **Swift** – these birds spend most of their lives flying, only ever landing to nest. Swifts spend the winter in Africa but travel to the UK to breed every year in April and May. They nest solely in small holes in walls and roof spaces in buildings and will return to the same nest site year after year.

Small blue butterfly

Swift

Tractor trimming verges

Pressures and threats

The key pressures and threats that affect the biodiversity value of our built environment include:

- **development**
- **management such as herbicide use and grass cutting**

Cumbria is experiencing growing **development pressure** on the edges of its urban areas, with increased new housing targets coming from central government. Local Plans endeavour to direct development to the most appropriate locations, but development can still occur outside the areas identified. This can lead to significant biodiversity loss and fragmentation. In addition, the redevelopment on brownfield land, though often encouraged by policy, can result in the loss of the ecological value these sites have acquired over time.

Modern developments tend to be 'neat', with **little allowance for nature** in their design. Where old buildings may have gaps and cracks for nesting birds and roosting bats, such opportunities are minimal in modern developments. Low maintenance options for gardens such as panel fencing, paving slabs, and artificial turf further reduce the value of our built environment for nature. Redevelopment and individual home improvement works can further add to this problem, leading to the loss or damage of important existing habitat within existing buildings and gardens.

More generally, urban areas tend to have lower biodiversity than surrounding rural areas. This is due to the **intensive use of land, fragmentation of green spaces**, and **pollution** from intense lighting and vehicle emissions which can make it harder for some species to survive.

Opportunities for recovery and wider benefits

Whilst built-up areas may not typically be as rich in nature as surrounding rural areas, they do present opportunities for nature recovery. They are also a vital part of how most people connect with nature. One of these opportunities is the provision of **green infrastructure**. This includes habitat corridors or 'stepping stones', which are strips or areas of land characterised by rich and varied vegetation, designed to connect green spaces in built-up areas that would otherwise remain isolated. They allow species to navigate our built-

up areas to find food and breeding or nesting sites and move between them and the surrounding countryside. In addition, the removal or adaptation of barriers, as well as sensitive lighting design (whilst also ensuring public safety) can help species move through built environments and connect them to the wider countryside.

These green corridors can also be combined with strategically planned footpaths and cycle ways, including National Trails. This not only connects habitats together, but also allows people to connect with nature. Otherwise known as active travel, moving through a built-up area by walking, cycling, or wheeling provides **health and wellbeing benefits** to those making purposeful journeys. There are also multiple studies showing the link between positive mental health and spending time outdoors in nature. Access to nature in general is also shown to have wide-reaching benefits to society. These include improved brain activity, blood pressure, and mental health[44]. **Access to nature** gives people the opportunity to engage with and be inspired by nature on their doorstep.

Concentrations of emissions from fossil fuel combustion from vehicles, and in some instances factories, tend to be higher in built-up areas. This can deteriorate the air quality within and around where most people live. Efforts to improve nature in built-up areas can **improve air quality** as vegetation and trees can intercept sulphur dioxide, nitrogen dioxide, and ammonia from the air. It can also capture particulate pollution on their leaves and form a physical barrier between people and pollutant sources. Urban trees help to mitigate the effects of climate change by providing shade and keeping our built-up areas cool.

There are also **economic benefits** to nature recovery. Nature provides us with water, clean air, and food amongst other goods and services to society that we depend on for our health and prosperity. These natural resources are known as 'natural capital' and are important to local and national economies, such as manufacturing, energy, farming, fishing, forestry, leisure, and tourism. All these things support local employment and skills. Cumbria's landscape attracts millions of visitors each year and tourism alone contributes £4.68bn to the local economy and employs nearly 46,000 people[45].

The government's Environmental Improvement Plan has a national environmental objective that **everyone should live within 15 minutes' walk of a green or blue space**.

44. Jimenez *et al.* (2021). Associations between Nature Exposure and Health: A Review of the Evidence. *International Journal of Environmental Research and Public Health,* 18(9), 4790.
45 Cumbria Tourism (2023). Available at www.cumbriatourism.org/resources/research

Cyclists on the Channelside Walk promenade in Barrow in Furness

Priorities and potential measures for nature recovery

Our vision:

"Our city, towns, and villages are rich in wildlife with connected, healthy, and diverse habitats that create space for nature to live, move, and thrive alongside people."

The following priorities and potential measures have been identified to help us achieve our vision. Measures including a place marker are mapped and can be viewed on the Local Habitat Map.

Priority 25: **Manage and enhance our built environment**

Enhance the ecological value of our built environment, to maintain existing habitat, minimise fragmentation, and maximise further opportunities for biodiversity, habitat connectivity, and nature recovery, while meeting community needs.

O20

Encourage nature-friendly practices in gardens, allotments, and community spaces, including:

- pollinator-friendly planting
- leaving grass long by reducing mowing
- using peat-free compost
- reducing pesticide and herbicide use
- creating holes in fences that allow wildlife such as hedgehog to move between different spaces
- retaining and maintaining hedgerows
- leaving rough margins and areas to be more 'wild'
- minimising the impacts our pets have on local wildlife

U1

Manage publicly accessible green spaces to contain more wildlife-rich habitat alongside their main functional needs by:

- enhancing/restoring/creating wildlife-rich habitats
- pollinator-friendly planting
- leaving grass long by reducing mowing
- timing mowing to benefit plant species biodiversity
- using peat-free compost
- reducing pesticide and herbicide use
- leaving rough margins and areas to be more 'wild'

U2

Manage brownfield sites to be wildlife-rich through long-term, site-specific, targeted management that maintains an appropriate balance of disturbance, and variety of vegetation species and structure, to benefit the species that they support.

U3 Safeguard and value the contribution of wildlife-rich brownfield sites in providing a range of resting, feeding, and breeding places for invertebrates, reptiles, and birds when considering development by:

- identifying and surveying our most valuable brownfield sites
- providing mitigation and compensation measures against their loss

U4 Improve the connectivity of nature corridors by targeting new and existing transport routes, active travel routes, and public rights of way for high quality green and blue infrastructure that delivers for biodiversity.

U5 Design urban planting schemes so that they use pollinator friendly trees, shrubs, grass species, and perennial plants.

U6 Maximise availability of urban growing spaces and allotments to increase nature corridors and stepping stones within the built environment.

U7 Safeguard existing nesting, breeding and roosting sites, and provide mitigation, compensation, and enhancement measures wherever possible, by:

- increasing awareness of specific buildings that support important colonies of nesting birds or roosting bats and mitigate against their harm
- integrating suitable numbers of universal bird bricks, swift bricks, and bat bricks into all new developments where possible (including extensions and alterations that require planning permission) in accordance with Building Standard BS42021

U8 Reduce and sensitively design artificial lighting to help bats and other nocturnal wildlife commute and forage.

U9 Engage with and educate businesses, schools, healthcare settings, other organisations, and significant landowners to help them in:

- recognising and maximising their assets potential to provide benefits to biodiversity
- capitalising on green finance or funding schemes (e.g. Biodiversity Net Gain)

G4	Work with national infrastructure operators, local authorities, and landowners to manage verges, transport corridors, and public rights of way to be wildlife-rich, and maintain existing wildlife-rich habitats by: • timing cutting to benefit plant species biodiversity • removing arisings • reintroducing missing plant species through scarification and seeding

F4	Restore natural species movement where movement is impeded, by: • removing redundant artificial barriers in river channels and lakes • installing appropriate alternative passage where barrier removal is not possible • installing under/over road tunnels/bridges near known habitat severance or breeding sites

Bespoke LNRS priority species-specific measures

Swift

S29	Minimise and mitigate against the destruction of existing swift nest sites by: • requiring planning applicants to check where swift nest sites have been recorded • avoiding carrying out building works on such buildings during the nesting season • mitigating against the loss of nest sites by putting up suitable swift bricks or boxes, as close as possible to the entrances to all existing swift nest sites

S30	Develop appropriate standards for recording data on swift nest sites, and collecting data, to make it easier for people to identify if their building supports swift nest sites.

Small blue butterfly

S31	Safeguard and expand populations of small blue in Cumbria by: • managing sites appropriately to benefit the growth and spread of kidney vetch • spreading seed/plants to suitable locations between populations • ensuring known sites that support small blue are protected, or loss of these sites is appropriately mitigated • translocating species to suitable sites from stable donor populations • conducting ongoing monitoring and research

Priority 26: **Create more wildlife-rich habitat within our built environment**

Create new wildlife-rich habitats in building developments in our built-up areas, creating a mosaic of interconnected habitats designed and managed for wildlife.

U4	Improve the connectivity of nature corridors by targeting new and existing transport routes, active travel routes, and public rights of way for high quality green and blue infrastructure that delivers for biodiversity.
U8	Reduce and sensitively design artificial lighting to help bats and other nocturnal wildlife commute and forage.
U10	Implement, manage, and maintain more wildlife-friendly features in urban and suburban areas through the planning process, such as: • green roofs • stone walls • ponds and swales • rain gardens • urban trees and woodland • hedgerows
U11	Design new urban water bodies to be wildlife-friendly by: • creating varied bank profiles and depths to provide a range of habitat conditions to support amphibians, invertebrates, and mammals • avoiding stocking of new water bodies intended for wildlife with fish or wildfowl

Windermere

G5

Increase species diversity and reduce nutrient levels in and around wildlife-rich grasslands by:

- reducing the use of pesticides and herbicides
- reducing the use of artificial inorganic and organic fertilisers

G8

Create new areas of wildlife-rich grassland targeting non-grassland sites such as previous quarries, ex-industrial land, landfill sites, and built-up areas through:

- adding local provenance green hay
- adding local provenance brush harvested seed and wildflower plugs
- maintaining an ecologically appropriate grazing and/or cutting regime
- managing soil nutrient levels where they are high and need reducing by topsoil stripping and/or short term no till arable cropping
- creating/improving suitable habitat for metapopulations of small blue butterfly to form

F13

Reduce the impact of road and urban runoff by:

- improving existing infrastructure
- incorporating high quality SuDS (sustainable urban drainage systems) into new developments and retrofitting them where feasible

Species recovery

There are over 700 species in Cumbria that are either threatened, near-threatened, or of local significance, and were therefore considered in the development of the LNRS. The health of these (and more common and widespread) species is primarily linked to the condition, extent, and connectivity between the habitats on which they rely. Many are also vulnerable to wider factors such as geomorphological processes, climate change, persecution, pollution, disturbance, and invasive non-native species.

The government's Environmental Improvement Plan has three national environmental objectives that specifically relate to species. These are to:

- **halt the decline in species abundance by 2030 and then increase abundance by at least 10% to exceed 2022 levels by 2042.**
- **improve the Red List Index for England for species extinction by 2042 compared to 2022 levels**
- **reduce the number of establishments of invasive non-native species by at least 50% in 2030, compared to levels seen in 2000**

Many species will markedly benefit from the potential habitat measures already identified. However, some species (or groups of species) are particularly at risk locally and need more specific measures beyond the general enhancement and expansion of habitat. Over 390 species were identified as needing more targeted interventions. Species are a priority for nature recovery in Cumbria. They have been sorted into **23 habitat-based assemblages**, where the species in each assemblage would benefit from targeted interventions in those habitats. These additional interventions have been embedded into the potential habitat measures so that species recovery is part of wider nature recovery.

Below left: Netted Carpet Moth, Below right: Atlantic Salmon

Drumburgh Moss NNR

Table 1 **Habitat-based assemblages.**

Habitat-based species assemblage	Habitat theme	Assemblage specific measures
Broadleaved woodland	Woodland, trees, and scrub	W1, W15, W17
Upland oakwood	Woodland, trees, and scrub	W1
Wet woodland	Woodland, trees, and scrub	W1
Veteran and ancient trees	Woodland, trees, and scrub	W12, W14
Upland blanket bog	Moorland, heathland, and montane	M1, M2
Moorland and upland grassland	Moorland, heathland, and montane	M2
Upland habitat mosaic	Moorland, heathland, and montane	W17, M2, M3, M6
Arctic alpine and montane	Moorland, heathland, and montane	M8, M9, M10
Farmland	Grassland and limestone pavement	O22, O26, O28
Hay meadow	Grassland and limestone pavement	G1, G7
Limestone grassland and pavement	Grassland and limestone pavement	G1, G7, G10
Wet/marshy grassland	Grassland and limestone pavement	G9
Mining spoil	Grassland and limestone pavement	G3
Rivers and streams	Wetland and freshwater	F1, F4
Lakes	Wetland and freshwater	F1, F4
Tarns, ponds and canals	Wetland and freshwater	F3
Wetland, fen and reedbed	Wetland and freshwater	F3, F10
Lowland raised bog	Wetland and freshwater	F8, F9
Saltmarsh and intertidal	Coastal and estuarine	C2, C4, C5
Dunes and wet slacks	Coastal and estuarine	C1, C5
Gardens and brownfield sites	Built environment	O20, U8
Urban water bodies	Built environment	U9, U12
Built-up areas	Built environment	U7, U9

In addition, **25 LNRS priority species (or species groups) requiring bespoke action** have been identified. These are species that are either particularly at risk, emblematic/representative of Cumbria and its habitats, or where their Cumbrian populations are nationally significant, and targeted action is required to help their recovery.

Table 2 **LNRS priority species requiring bespoke action.**

Common name	Scientific name	Taxon group	Habitat assemblage	Species specific measure
Red squirrel	*Sciurus vulgaris*	Terrestrial mammal	Broadleaved woodland	S1, S2
Netted carpet moth	*Eustroma reticulata*	Insect – moth	Wet woodland	S3
Hazel dormouse	*Muscardinus avellanarius*	Terrestrial mammal	Broadleaved woodland	S4
Willow gloves fungus	*Hypocreopsis lichenoides*	Fungus	Wet woodland	S5
Sparkling signal moss	*Hageniella micans*	Moss	Upland oakwood	S6
Ricasolia amplissima	*Ricasolia amplissima*	Lichen	Ancient and veteran trees	S7
Upland breeding waders: curlew, dunlin, golden plover, lapwing, oystercatcher, redshank, and snipe	*Numenius arquata* *Calidris alpina* *Pluvialis apricaria* *Vanellus vanellus* *Haematopus ostralegus* *Tringa totanus* *Gallinago gallinago*	Bird	Upland blanket bog Farmland	S8
Black grouse	*Tetrao tetrix*	Bird	Upland mosaic	S9
Hen harrier	*Circus cyaneus*	Bird	Moorland and upland grassland	S10
Arctic alpine plants	Numerous	Flowering plant	Arctic alpine and montane	S11, S12
Waxcap fungi	*Entoloma bloxamii s. lat* *Entoloma prunuloides* *Gliophorus reginae* *Gloioxanthomyces vitellinus* *Neohygrocybe nitrata* *Clavaria zollingeri*	Fungus	Waxcap fungi	S13
Arctic charr, vendace and schelly	*Salvelinus alpinus* *Coregonus albula* *Coregonus lavaretus*	Bony fish	Lakes	S14, S15
Atlantic salmon	*Salmo salar*	Bony fish	Rivers and streams	S16
White-clawed crayfish	*Austropotamobius pallipes*	Crustacean	Rivers and streams	S17
Freshwater pearl mussel	*Margaritifera margaritifera*	Mollusc	Rivers and streams	S18
Water vole	*Arvicola amphibius*	Terrestrial mammal	Rivers and streams	S19
White-faced darter	*Leucorrhinia dubia*	Insect – dragonfly	Lowland raised bog	S20
Rosy marsh moth	*Coenophila subrosea*	Insect – moth	Lowland raised bog	S21, S22
Window-winged sedge	*Hagenella clathrata*	Insect – caddis fly	Lowland raised bog	S23, S24
Natterjack toad	*Epidalea calamita*	Amphibian	Dunes and wet slacks	S25
Northern dune tiger beetle	*Cicindela hybrida*	Insect – beetle	Dunes and wet slacks	S26
Ringed plover	*Charadrius hiaticula*	Bird	Saltmarsh and intertidal	S27
St Bees seed-eater	*Harpalus honestus*	Insect - beetle	Saltmarsh and intertidal	S28
Swift	*Apus apus*	Bird	Built-up areas	S29, S30
Small blue butterfly	*Cupido minimus*	Insect - butterfly	Garden and brownfield	S31

Priorities and potential measures for species recovery

The following priority has been identified to target species recovery across Cumbria:

Priority 27: **Species recovery**

Maintain, and where possible increase, population size, extent, and diversity of Cumbria's key native species.

Many of the species-specific measures and assemblage-specific measures to help achieve this priority relate to habitat management. Therefore, the potential species measures are presented within the relevant habitat sections alongside their wider potential habitat measures. In addition, overarching priority number 2 and its associated potential measures address invasive non-native species.

Species reintroductions

This LNRS prioritises the species that are already established in Cumbria and the habitats that support our current species. This is to ensure that we safeguard and recover what we already have as our main priority. However, our habitats could also potentially support the **reintroduction** of species. For example, species that are either no longer found in the county or are absent from significant parts of their former range. This potential would grow as we continue make progress in restoring our habitats to better condition.

If species reintroductions are explored, these should take a rigorous and informed approach. They should follow IUCN species re-introduction guidelines, any licensing requirements, and consider the anticipated impact of climate change predictions. As with the priorities and potential measures outlined in the LNRS, any species reintroduction project should be informed by detailed site-specific feasibility studies. They should also be in line with the LNRS principles for nature recovery and undertaken with specialist ecological advice.

The following species have reintroduction projects or feasibility studies already underway. They have been identified as having the potential for reintroduction to Cumbria (or translocation within Cumbria to reintroduce them to other parts of the county) in the short- to medium-term (within the lifespan of this LNRS).

Based on historical records and specialist ecological input through the LNRS species group, the following species have been identified as having the potential for reintroduction to Cumbria in the longer term (10+ years and therefore beyond the lifespan of this LNRS). Actions within the lifespan of this LNRS should focus on landscape scale habitat enhancement, restoration, and creation, including connecting and expanding existing suitable habitats to help make Cumbria "reintroduction ready" for these species.

Table 3 **Species that are considered to be candidates for reintroduction.**

Common name	Taxon scientific name	Taxon group	Habitat theme
Short- to medium- term			
White tailed eagle	*Haliaeetus albicilla*	Bird	Woodland, trees, and scrub
Black grouse	*Tetrao tetrix*	Bird	Moorland, heathland, and montane
Eurasian aspen	*Populus tremula*	Flowering plant	Woodland, trees, and scrub
Eurasian beaver	*Castor fiber*	Terrestrial mammal	Wetland and freshwater
European pine marten	*Martes martes*	Terrestrial mammal	Woodland, trees, and scrub
Longer term			
Golden eagle	*Aquila chrysaetos*	Bird	Moorland, heathland, and montane
Corncrake	*Crex crex*	Bird	Moorland, heathland, and montane
Crane	*Grus grus*	Bird	Wetland and freshwater
Twite	*Linaria flavirostris*	Bird	Moorland, heathland, and montane
Native oyster	*Ostrea edulis*	Mollusc	Coastal and estuarine

Local Habitat Map

The main purpose of the LNRS is to:

- **identify our priorities for nature recovery**
- **identify our potential measures that would help meet these priorities**
- **map the locations where delivering these potential measures would make a particular contribution to achieving those priorities and would be most likely to provide the greatest benefit for biodiversity and the wider environment**

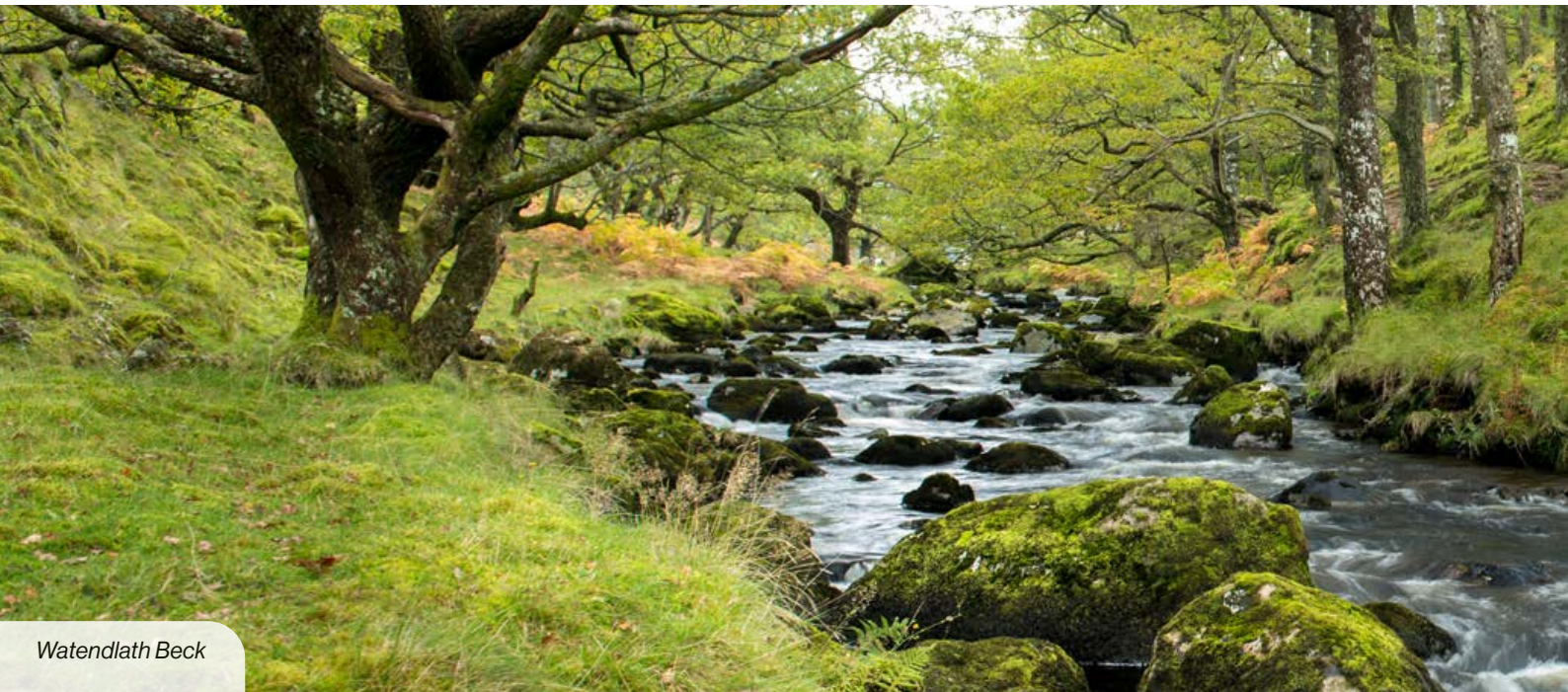
The Statement of Biodiversity Priorities and the Local Habitat Map should be used together to inform decision-making. They identify the actions and locations where targeting of resources and effort will have the greatest benefit and encourage collaboration.

The Local Habitat Map identifies zones within which opportunities for nature recovery are strategically significant at a landscape scale. **It does not operate at a field scale** resolution, but it can show how nature recovery on your land fits into the wider landscape.

The Local Habitat Map does not mandate any requirement to implement the identified potential measures. Any nature recovery projects should be informed by detailed site-specific feasibility studies and be in line with our principles for nature recovery.

Nature recovery networks

To identify where to target our efforts for nature recovery, we must first understand what habitats we have in Cumbria. The Cumbria Biodiversity Data Centre carried out a review of new and existing habitat data, from both local and national sources, to gather as much information as possible. This information helped create the Cumbria Habitat Base Map. This was then used with the Natural England Habitat Network Model to create local nature recovery networks that show where we could improve, restore, or create specific habitats.



Watendlath Beck

The local nature recovery networks are grouped by each **broad habitat theme**:

- **Woodland, trees, and scrub**
- **Moorland, heathland, and montane**
- **Grassland and limestone pavement**
- **Wetland and freshwater**
- **Coastal and estuarine**
- **Built environment**

These networks show the existing wildlife-rich habitats for each theme, along with the opportunities for restoration or creation of these. The maps are available to view online, and the data can also be downloaded as a shapefile to be used in GIS software.

Local nature recovery network categories

Enhance

This includes the improvement of **existing wildlife-rich habitats** (e.g. upland hay meadow) to give better condition or distinctiveness of habitat. These areas form the core of the habitat network models and actions to enhance these will make our wildlife-rich habitats better.

Restore

This applies to **degraded or fragmented habitats that are not currently classed as wildlife-rich**. Associated potential measures would result in improving their condition or distinctiveness to make them wildlife-rich **where the broad habitat type would stay the same** (e.g. modified grassland being transformed into hay meadow). Actions in these areas would make these habitats bigger, better (depending on their location), and more joined up.

Create

This is on land that could be suitable for the **creation of wildlife-rich habitat and would result in a broad change in habitat type** (e.g. modified grassland being transformed into broadleaved woodland). This will make our existing wildlife-rich habitats bigger and more joined up.

‘Areas of Particular Importance for Biodiversity’ and ‘Areas that Could Become of Particular Importance’

The Local Habitat Map can be divided into three parts:

▶ Areas of Particular Importance for Biodiversity

These are made up of sites that are already protected under planning policy for their biodiversity value and include:

- all statutorily designated nature conservation sites (SPAs, SACs, Ramsar sites, SSSIs, NNRs, LNRs, LPOs and HPMAs)
- County Wildlife Sites
- irreplaceable habitats

▶ Areas that Could Become of Particular Importance

The parts of the nature recovery networks that fall outside of the Areas of Particular Importance for Biodiversity are classified as Areas that Could Become of Particular Importance.

▶ Areas outside of the nature recovery network

Some areas won’t fall within a strategic network and therefore won’t have measures shown on the map. **Everywhere is important for nature recovery.** A lot can still be done for nature recovery in these areas, including many of the unmapped potential measures. Over 70% of potential measures in the strategy are unmapped. This is because they are beneficial almost anywhere, or because of insufficient information to map specific locations for a potential measure.

Similarly, if a measure isn’t mapped in a certain area, it doesn’t mean that it isn’t suitable. It just means that it isn’t the most strategically important location for that measure to take place for the purpose of the nature recovery network. These areas can still be used to deliver mapped potential measures if site surveys determine them to be a suitable location.

Below left: Friends walking over River Duddon, Below right: White-faced darter dragonfly

What if there is more than one mapped measure for my area of interest?

Where an area of land is suitable for more than one potential measure, the Local Habitat Map will show multiple overlapping potential measures. **Prioritising which measure should take place should be decided on a site-by-site basis, after considering wider benefits, funding, site surveys, viability, and specialist advice.** The following factors, in no particular order, should be considered when prioritising potential measures:

- Does it contribute towards climate change mitigation through **carbon sequestration**?
- Does it contribute towards **climate change adaption and resilience**?
- Does it help to improve **water quality** in our rivers and lakes?
- Is it a particularly strategic location for delivering **natural flood management**?
- Does it mitigate or provide resilience against **coastal erosion**?
- Does it help to improve **air quality** around sensitive receptors?
- Does it enhance or reinforce our **natural and cultural heritage**?
- Is it particularly strategic for increasing people's **access to nature**?
- Does it provide particular benefit to people's **health and wellbeing**?
- Is there a particular opportunity to **engage or educate** people in nature recovery?
- Is there a potential link to green finance or other **economic opportunities**?
- Is there already **funding** in place for a particular measure?
- Is there an **existing project** or interest group that would deliver the measure?
- Is there **landowner/land manager preference** or particular interest in delivering the measure?
- Is the delivery of the measure limited to **specific localised conditions** or areas, for which the proposed location is particularly viable?

Additional datasets that show where a potential measure may provide a particular contribution to wider benefits have been added to the mapping portal under 'Additional non-statutory information'. These can be overlaid with the Local Habitat Map to identify locations where implementing potential measures could yield wider environmental and societal benefits as well as benefits for nature. While these additional datasets reflect the most up-to-date information available, they are subject to future updates. Therefore, it is crucial to use this overlay functionality with a level of discretion. Always complement it with site-specific surveys and adhere to guiding principles (page 27) for reliable on-the-ground evaluations to inform decision-making.

Review and update

The Local Habitat Map is hosted by Cumbria Biodiversity Centre on behalf of Westmorland and Furness Council. It will be reviewed and updated every 3 to 10 years as per the statutory guidance for the LNRS.

The Local Habitat Map is only as good as the data it is made from. A key limitation identified during the development of this LNRS is the lack of local data. Cumbria Biodiversity Data Centre provides a hub for storing and sharing any such data with relevant organisations and businesses. It also uses the data to further develop the Cumbria biodiversity evidence base, and subsequent versions of the Local Habitat Map. We encourage anyone who is collecting habitat or species data in Cumbria to share it with Cumbria Biodiversity Data Centre. Adding it to their database will improve our understanding of the state of nature and inform future monitoring of nature recovery action in our county.

Conclusion

Realising the vision

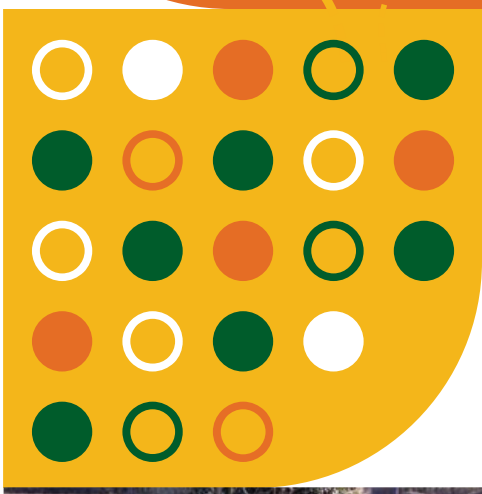
“A walk in the fells is a treat for the senses. Skylarks sing overhead. Vibrant bog mosses are dotted with the crimson and white of wild cranberry and grass-of-Parnassus. Cool woodland offers welcome shade.

Behind the beauty, work is being done. Carbon is locked away in the peat. Wetlands store and slow the flow of water to communities downstream. Trees and hedgerows clean the air. Nature-friendly farming produces healthy organic food.

Miles and miles of roadside verges buzz with life. Wildflowers brighten people’s daily journeys and provide food for bees and butterflies. At the end of the journey, you don’t just see offices or shops. You’re welcomed to nature-rich spaces with wildflowers, trees, and birdsong.

Clean, clear rivers sparkle as they flow through our towns and countryside. They teem with life and connect our precious uplands to the stunning coast. The lucky can catch a glimpse of otter or kingfisher. Rivers also have a job to do – connecting to floodplains and slowing the flow of water through catchments.”

Cumbria’s natural environment is vital for countless species and provides **invaluable benefits to nature and our communities.** The creation of this strategy is the first step on an important journey, and its success hinges on our **collective commitment** to action. It requires the dedication, collaboration, and shared vision of landowners, farmers, conservation organisations, businesses, local authorities, and individual residents across Cumbria. The LNRS is more than just a document. It is a call to action, and an **invitation to work together** to translate these ambitions into tangible results on the ground.



The development of the Cumbria Local Nature Recovery Strategy has been a collaborative effort. We thank all those who contributed their time, expertise, and passion to its creation.

Thank you for your interest. To learn more or get involved, please visit

cumbrialnrs.org.uk

or contact us at **cumbria.lnrs@westmorlandandfurness.gov.uk**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Glossary

Agroforestry – the integration of trees into the farming system, while maintaining or enhancing the farm's main agricultural output.

Ancient and veteran trees – a tree of considerable age that is of interest biologically, culturally or aesthetically because of its age, size or condition, including the presence of deadwood micro-habitats.

Ancient Semi-Natural Woodland (ASNW) – ancient woodland composed of mainly locally native trees and shrubs that derive from natural seed fall or coppice rather than from planting. These woodlands are irreplaceable habitats and generally support the greatest level of woodland biodiversity, including rare species of plants, fungi, and insects.

Ancient woodland – an area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland and plantations on ancient woodland sites (PAWS).

Areas of Particular Importance for Biodiversity (APIB) – areas that already have significant ecological value. They are made up of sites that are already protected under planning policy for their habitat value. They include:

- all national conservation sites (SPAs, SACs, Ramsar sites SSSIs, NNRs)
- County Wildlife Sites
- irreplaceable habitats

Areas that Could Become of Particular Importance (ACB) – areas on the Local Habitat Map identified as having particular potential for enhancement, restoration, or creation but that fall outside of the Areas of Particular Importance for Biodiversity

Assemblage – a group of species that coexist within a specific habitat(s) and largely benefit from the same management measures. Considering species in habitat-based assemblages helps us to identify potential measures that are beneficial for as many species as possible.

Authority – an administrative government funded body.

Biodiversity – the variety of life found in a place, and their interactions. It can be measured by the number of different species. Otherwise known as species-richness.

Biodiversity Net Gain (BNG) – an approach to development and land management that aims to leave the natural environment in a measurably better state than it was beforehand. New developments are legally required to provide BNG, unless they are exempt.

Brownfield – a piece of land that has been previously developed (built on) but is now vacant, derelict, or unused. These sites often have the potential for redevelopment but may be contaminated with pollutants or have other environmental issues. Brownfield sites can support a wide range of species and can be very biodiverse habitats.

Built environment – a broad habitat theme used in the Cumbria LNRS. It includes:

- open mosaic habitats on previously developed land
- developed land such as buildings
- gardens
- infrastructure
- amenity areas
- lower wildlife value brownfield sites

Carbon offsetting – a process of compensating for carbon dioxide emissions by funding projects that remove and equivalent amount of carbon dioxide from the atmosphere. By offsetting their carbon emissions, individuals and organisations can contribute to climate change mitigation efforts and help to reduce their overall carbon footprint.

Chemical status – refers to the quality of water in terms of its chemical composition. It is a parameter by which the Water Framework Directive is assessed. Good status represents the water body condition being as it would be with little or no human impact.

Coastal and estuarine – a broad habitat theme used in the Cumbria LNRS. It includes:

- supratidal habitats (maritime cliff and slopes, coastal sand dunes, coastal vegetated shingle)
- intertidal habitats (coastal saltmarsh, intertidal mudflats, intertidal underboulder communities, *sabellaria alveolata* reefs, sheltered muddy gravels, peat and clay exposures with piddocks, seagrass beds wildlife-rich coastal saltmarsh and saline reedbeds, wildlife-rich littoral sand, sediment and rock)
- subtidal habitats (saline lagoons)

Continuous cover forestry – an approach to forest management in which a range of silvicultural systems are used to maintain the forest canopy at one or more levels without clear-felling.

County Wildlife Site (CWS) – an area that is locally important for the conservation of the habitats and species that they support. Their designation is non-statutory, but recognises their significance, with many sites being of county and often regional importance for wildlife. Most County Wildlife Sites are owned by private individuals.

Create – creating wildlife-rich habitat where none currently exists, resulting in a broad change in habitat type (e.g. modified grassland being transformed into broadleaved woodland). This will make our existing wildlife-rich habitats bigger and more joined up.

Deadwood – all types of wood that are dead, including whole or wind-snapped standing trees, fallen branch wood and stumps, decaying wood habitats on living trees such as rot holes, dead limbs, decay columns in trunks and limbs, and wood below the ground as roots or stumps. Deadwood of native species that exceeds 200 mm diameter and is associated with sites of high ecological value contributes the most to biodiversity.

Drainage grip – a narrow channel dug into the soil to divert surface water and lower the water table, making the land more suitable for growing grasses, which can be grazed by livestock.

Dune slacks – low-lying areas between dune ridges where freshwater pools can form. Formed by wind erosion or blowouts, dune slacks are characterised by their unique ecology, supporting specialised plant and animal life.

Dynamic succession – the process by which the mix of species and habitats change over time. It can occur after the initial colonisation of a newly created habitat, of after a disturbance events.

Ecological status – refers to the overall health of water bodies, including rivers, lakes, and coastal waters, based on the condition of their ecosystems. It is a parameter by which the Water Framework Directive is assessed. Several parameters are included in the assessment of good status, including biological quality, pollutants, consideration of the natural flow and physical features. Failure of just one of these means that it is not possible to achieve good ecological status.

Ecosystem – a complex system where living organisms interact with each other and their non-living environment where every part is connected.

Enhance – improvement of the condition or distinctiveness of existing wildlife-rich habitats (e.g. upland hay meadow). This is the focus of the network model.

Epiphyte – a plant that grows on the surface of another plant, but derives its moisture and nutrients from the air, rain, water or from debris accumulating around it, rather than the host plant.

Fluvial – relating to, or living in, a river or stream. This term is often used in geography and geology to describe processes, landforms, and deposits that are associated with flowing water.

Gabion – a cage, cylinder, or box filled with rocks, concrete, or sometimes sand and soil for use in civil engineering, road building, military applications, and landscaping. Gabions are often used for erosion control, retaining walls, riverbank protection, and decorative features.

Geodiversity – the variety of earth materials, forms, and processes that shape the earth found in a place. This can include minerals, rocks, sediments, fossils, soils and water.

Good condition – habitat that can function properly and is able to support a range of plant and animal species. To be classified as being in good condition, habitats should meet the Department for Environment Food and Rural Affairs (Defra) statutory biodiversity metric condition criteria[46], or equivalent criteria as outlined in Natural England's Technical Information Note '*TIN219: Environment Act Habitat Target – Definitions and Descriptions*' (2024).

Grasslands and limestone pavement – a broad habitat theme used in the Cumbria LNRS. It includes:

- meadows (lowland meadows, upland hay meadows) and wildlife-rich neutral grassland
- calcareous grassland (lowland calcareous grassland, upland calcareous grassland)
- acid grassland (lowland dry acid grassland, wildlife-rich lowland acid grassland, wildlife-rich upland acid grassland)
- coastal and floodplain grazing marsh
- calaminarian grasslands
- limestone pavements
- grass moorland
- other neutral grassland
- improved grassland

Greenfield – refers to undeveloped land that has not been previously built on or used for industrial purposes. It often consists of open fields, forests, or other natural landscapes.

Green finance – when financial risks and opportunities from climate and environmental factors are integrated into financial decision-making. It allows for investment into nature-based solutions to support the delivery of the UK's carbon targets and clean, green growth.

46. Defra (2025). *Statutory biodiversity metric tools and guides.* Available at www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides

Green infrastructure – multi-functional green and blue spaces and other natural features, urban and rural, which can deliver a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities, and prosperity.

Green social prescribing – the practice of supporting people to engage in nature-based interventions and activities to improve their mental and physical health. These could include local walking schemes, community gardening projects, conservation volunteering, green gyms, open water swimming or arts and cultural activities which take place outdoors.

Highly Protected Marine Area (HPMA) – a marine area that protects the seabed and water column (including all habitats and species) from extractive, destructive and depositional activities such as commercial and recreational fishing, dredging, construction, or anchoring. They are designated as Marine Conservation Zones and protected under UK law by the Marine and Coastal Access Act 2009.

(Agriculturally) Improved grassland – grassland that has been modified through human intervention to increase its productivity for agricultural purposes. This typically involves practices such as: seeding of selective grass species, adding fertiliser, drainage, and irrigation.

Intertidal – coastal habitats that occur between high tide and low tide and so are frequently submerged by the sea. Their form is dependent on their coastal location, degree of wave action, and substrate.

Invasive Non-Native Species (INNS) – are plants, animals, or other organisms that have been introduced to an area outside their natural range and cause harm to the environment, economy, or human health.

Irreplaceable habitat – a type of habitat that is extremely difficult or impossible to restore, recreate, or replace once it has been destroyed. Irreplaceable habitats are determined by Defra and include ancient woodland, ancient and veteran trees, blanket bog, limestone pavements, coastal sand dunes, spartina saltmarsh swards, mediterranean saltmarsh scrub, and lowland fens. These habitats should be maintained, enhanced and protected for centuries to come.

Landscape scale recovery – a holistic approach to landscape management that balances environmental, social, and economic pressures. It aims to conserve large, interconnected, unfragmented landscapes that allow wildlife to migrate and move freely. Landscape scale involves collaboration and working at a large scale, often around a catchment or other recognisable landscape unit.

Limestone pavement – an area of limestone which lies wholly or partly exposed on the surface of the ground and has been fissured by natural erosion.

Local Habitat Map – the map that accompanies the Statement of Biodiversity Priorities. It shows the opportunity areas where undertaking a particular measure would be particularly strategic and deliver maximum benefit.

Local Nature Recovery Strategy (LNRS) – a locally led, evidence-based strategy that is a requirement of the Environment Act (2021). LNRSs agree priorities for nature recovery and propose actions in locations where they would make a particular contribution to achieving those priorities. They are made up of a Statement of Biodiversity Priorities, and a Local Habitat Map.

Local Nature Reserve (LNR) – an area that is protected for its local importance for wildlife, geology, education or enjoyment. Local authorities have the power to designate LNRs under Section 21 of the National Parks and Access to the Countryside Act 1949.

Local Plan – a statutory document prepared by local planning authorities (local authorities and national park authorities). It sets out policies and proposals for land use and development in a given area, including housing, employment, and environmental protection. Local Plans guide decisions on planning applications and must take account of national planning policy and relevant strategies such as the Local Nature Recovery Strategy.

Low Impact Silvicultural System (LISS) – a forest management system, such as continuous cover forestry, that encourages structural and species diversity and evolutionary adaptation by promoting natural regeneration.

Low-input farming – a farming system that aims to minimise the use of off-farm inputs, such as fertilisers, pesticides, and feed, while optimising the use of on-farm resources, such as grazing land and existing habitats, to make the farm more sustainable and profitable.

Macrophytes – aquatic plants that grow in or near water.

Marine Conservation Zone (MCZ) – a protected area that supports a range of nationally important, rare or threatened marine habitats and species. They are designated under the Marine and Coastal Access Act 2009.

Moorland, heathland, and montane – a broad habitat theme used in the Cumbria LNRS. It includes:

- blanket bog
- heathland (upland heathland and lowland heathland)
- montane habitats (mountain heaths and willow scrub and inland rock outcrop and scree)
- valley mire
- fragmented heath

Our uplands are characterised by their large unenclosed nature, forming a complex mosaic of different habitats across the landscape. This habitat theme discusses the habitats that are not covered under the 'Wetland and freshwater', 'Grasslands', and 'Woodland, trees, and scrub' themes.

National Character Area (NCA) – an area of distinct and recognisable character at the national scale. These areas follow natural boundaries rather than administrative ones, making them a useful tool for understanding and managing the English landscape.

National Conservation Site – a protected area that is designated for its exceptional natural significance. These sites are protected by UK law and managed to preserve their habitats and the species they support.

National Landscape – an area of land recognised for its distinctive character and beauty. The legal designation is 'Area of Outstanding Natural Beauty', and they are protected under the National Parks and Access to the Countryside Act 1949.

National Nature Reserve (NNR) – an area that is protected for its nationally important habitats, species and geology, and to provide 'outdoor laboratories' for research. Natural England has the power to designate NNRs under the Wildlife and Countryside Act 1981. NNRs managed by Natural England are open to the public, and visitors are encouraged to connect with nature.

National park – a large area of relatively undeveloped and scenic land protected by law for its natural beauty, wildlife, and cultural heritage. National parks are designated under the National Parks and Access to the Countryside Act 1949 and have more restrictive planning controls than elsewhere.

Native species – species that have arrived and inhabited an area naturally, without deliberate assistance by humans.

Natural capital – natural resources including geology, soils, air, water and all living organisms, that provide value or services to society. These have a market value (such as timber or water quality) or a non-market value (such as recreation or landscape amenity).

Peat – a largely organic substrate consisting of partly decomposed plant material forming a deposit on acidic, boggy ground.

Peatland Code – a voluntary certification standard for UK peatland restoration projects that want to market the climate benefits of peatland restoration. It provides assurances to voluntary carbon market buyers that the climate benefits being sold are real, quantifiable, additional, and permanent. It is an example of carbon offsetting, and natural capital financing.

Plantation on Ancient Woodland Site (PAWS) – planted forests of native or non-native tree species that have replaced the original 'natural' woods on sites with a long history of woodland cover (see ancient woodland).

Potential measure – a specific practical action which if implemented would help to achieve one of more priorities of the LNRS.

Priority – a shorter term (3–10 year) target that is a result that this LNRS is seeking to achieve.

Priority habitat – habitats that are included on the list of 'Habitats and species of principal importance in England'. This list is a legal duty under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Public Space Protection Order – wide-ranging and flexible powers for local authorities, granted under the Anti-social Behaviour, Crime and Policing Act 2014. Rather than targeting specific individuals or properties, they focus on the identified problem behaviour in a specific location. The legislation provides for restrictions to be placed on behaviour that apply to everyone in that locality.

Ramsar site – an area that is protected due to it being a wetland site of international importance. Designated under the Ramsar Convention, they contain representative, rare or unique wetland types, or are international important for conserving biological diversity.

Reintroduction – human intervention to establish a new population of a plant or animal species that is either no longer found in Cumbria or is absent from significant parts of their former range.

Responsible Authority – a Defra appointed authority, as listed in section 105(2)(a) to (e) of the Environment Act 2021, responsible for preparing, publishing, reviewing, and republishing the LNRS for a specific geographic area. The Responsible Authority for Cumbria is Westmorland and Furness Council.

Restore – improving the condition or distinctiveness of degraded or fragmented habitats that are not currently classed as wildlife-rich, where the broad habitat type would stay the

same (e.g. modified grassland being transformed into hay meadow). Associated potential measures would result in them becoming wildlife-rich.

Riparian – relating to, or situated adjacent to, a watercourse or water body.

Scrub – a plant community dominated by shrubs and bushes. A successional habitat which is in transition between one habitat and another. It is normally dominated by shrubs and bushes such as hawthorn, gorse, brambles and thickets, and nettles.

Silviculture – the growing and cultivation of trees, including techniques of tending and regenerating forests, and harvesting their physical products.

Site of Special Scientific Interest (SSSI) – an area that is protected for its particular interest to science, due to it being nationally significant for the rare species of fauna or flora, or important geological features it contains. These sites are protected under UK law by the Wildlife and Countryside Act 1981.

Special Area of Conservation (SAC) – an area that is protected for the special habitats and/or species is supports, that are of international significance. They were originally designated under the Habitats Directive (EU legislation) and following 'Brexit' are protected under UK law by the Conservation of Habitats and Species Regulations 2017.

Special Protection Area (SPA) – an area that is protected for birds of international significance. They were originally designated under the Birds Directive (EU legislation) and following 'Brexit' are protected under UK law by the Conservation of Habitats and Species Regulations 2017.

Species of Principal Importance – species that are included on the list of 'Habitats and species of principal importance in England'. This list is a legal duty under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Statement of Biodiversity Priorities – this written document that forms part of the LNRS, along with the Local Habitat Map.

Structural diversity – the degree of physical variation in the different elements of a habitat.

Subtidal – coastal habitats that occur below low tide.

Suitable Alternative Natural Greenspace (SANG) – an area of open space that is enhanced to encourage public use and enjoyment and divert visitors away from sensitive natural areas such as SPAs and SACs.

Supporting Authority – a Defra appointed authority that is not the Responsible Authority. Supporting Authorities in Cumbria are Natural England, Cumberland Council, Lake District National Park Authority and Yorkshire Dales National Park Authority.

Supratidal – coastal habitats that occur above the spring high tide line but within the 'splash zone'. The sea still affects them, but they are not submerged by the sea.

Sustainable management – the stewardship and use of land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, and vitality. It also maintains their potential to fulfil relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems.

Translocation – human intervention to assist individuals from an established plant or animal population to expand their current range within Cumbria by moving individuals to new sites.

Vision – a long-term (20–30 year) shared aspiration or goal for the future of nature recovery that outlines what the natural environment could look like if action for nature recovery is taken.

Wider benefits – actions which support and draw on nature to provide wider environmental or societal benefits, for example improvements to the water environment, flood risk management, or climate mitigation and adaptation.

Wetland and freshwater – a broad habitat theme used in the Cumbria LNRS. It includes:

- rivers and streams
- lakes, tarns, and ponds (oligotrophic and dystrophic lakes, mesotrophic lakes, eutrophic standing waters, ponds, aquifer fed naturally fluctuating water bodies)
- fen, marsh, and swamp (upland flushes fens and swamps, purple moor grass and rush pastures, lowland fens, reedbeds, wildlife-rich floodplain wetland mosaics)
- lowland raised bog
- other modified water bodies
- other wetland habitats

Wildlife-rich habitat – is a natural or semi-natural area that is in good condition and supports a diverse and abundant range of flora and fauna. It is not just about the number of species, but also the quality of the habitat and its ability to sustain a healthy ecosystem. These habitats are crucial for nature recovery because they provide the food, water, and shelter that wildlife need to thrive.

Wood pasture – areas of historical, cultural, and ecological interest, where grazing is managed in combination with a proportion of open tree canopy cover.

Woodland Carbon Code – a voluntary certification standard for UK woodland projects that want to market the climate benefits of woodland creation. It provides assurances to voluntary carbon market buyers that the climate benefits being sold are real, quantifiable, additional, and permanent. It is an example of carbon offsetting, and natural capital financing.

Woodland, trees, and scrub – a broad habitat theme used in the Cumbria LNRS. It includes:

- broadleaved woodland (lowland mixed deciduous woodland, lowland beech and yew woodland, upland oakwood, upland mixed ashwoods, upland birchwoods, wet woodland, wildlife-rich native broadleaved woodland, and wildlife-rich mixed woodland)
- traditional orchards
- wood pasture and parkland
- hedgerows
- wildlife-rich scrub
- bracken
- coniferous woodland
- trees outside woodland
- ancient woodland and ancient and veteran trees

World Heritage Site – landmarks or areas with legal protection by an international convention administered by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). These sites are designated for having cultural, historical, scientific, or other forms of significance.

Westmorland & Furness Council

Cover: River management at Brotherswater
Below: Duddon Estuary and Black Combe

Supported by:

Cumberland Council

Lake District National Park

YORKSHIRE DALES National Park Authority

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